ENVIRONMENTAL IMPACT ASSESSMENT REPORT

ADDENDUM REPORT
(including appended chapters)

To be read as an Addendum to both the Non-Technical Summary and main body of the Environmental Impact Assessment Report

PROPOSED LARGE-SCALE RESIDENTIAL DEVELOPMENT

AT

RAILPARK, MAYNOOTH, CO. KILDARE

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1.0 INTRODUCTION AND METHODOLOGY

1.1 Background and Further Information Request

On 2nd October 2025, Cozone Ventures Limited, applied to Kildare County Council for a Large-scale Residential Development (LRD) on lands at Railpark, Maynooth, Co. Kildare (Reg. Ref.: 2561119) for 581 no. residential units, a neighbourhood centre and associated site development and infrastructural works on a site of approximately 15.27 hectares. The application site is bound by Parklands housing estate to the northwest and situated west of the residential properties within the Rockfield development and northeast of the permitted residential development 'The Grange' under Reg. Ref.: 21155 / ACP Ref.: 312671-22 (Phase 1) and Reg. Ref.: 21156 / ACP Ref.: 312685-22 (Phase 2), which is currently under construction, north of Maynooth Educate Together National School on the Celbridge Road (R405) and bordered by agricultural lands to the north, east, south and south east.

The application was accompanied by an Environmental Impact Assessment Report (EIAR). After a review of the planning application documentation, Kildare County Council issued a request for Further Information on the 25th November 2025. The further information request included a total of 11 no. items. In response to Item 10 and 11 of the FI request (see FI Cover Letter Response) and due to the changes to the overall site layout proposals, including an increase in unit numbers from 581 to 589 no. residential units, it was considered appropriate to prepare this Addendum to the EIAR.

1.2 Purpose and Structure of this EIAR Addendum

Directive 2014/52/EU (the 2014 Directive amending the 2011 codifying Directive) defines '*environmental impact assessment'* as a process, which includes the responsibility of the developer to prepare an Environmental Impact Assessment Report (EIAR), and the responsibility of the competent authority (in this case, Kildare County Council) to provide reasoned conclusions following the examination of the EIAR and other relevant information.

The specific objectives of the EIAR submitted with the initial application documents submitted on 2nd October 2025 was to identify and predict the likely environmental impacts of the proposed development; to describe the means and extent by which they can be reduced or ameliorated; to interpret and communicate information about the likely impacts; and to provide an input into the decision making and planning process.

The purpose of this EIAR Addendum Report is to summarise the updates to the EIAR in the main body of this report and refer to updated chapters in Appendix 1 to 4 which are considered necessary to submit in response to the FI Request. The EIAR Addendum Report and Appendices assess the changes to the proposed development arising from the applicant's response to the request for further information from Kildare County Council, having regard to the findings of the Environmental Impact Assessment Report submitted in conjunction with the initial planning application documentation, and in particular to respond to the specific items raised by the Planning Authority in Item 10 and 11 of the FI request.

This EIAR Addendum Report has been prepared in response to Items 10 and 11 of the Further Information request and addresses the updates to the EIAR required to respond to these items. In addition, the Archaeology chapter has been updated following the completion of test trenching. The following Chapters have been updated as a result and included in the accompanying appendices and summarised in the main body of the report below:

- Population and Human Health;
- Archaeology, Architectural and Cultural Heritage;
- Climate;
- Mitigation and Monitoring.

Furthermore, having reviewed all of the relevant information, John Spain Associates and the relevant consultants can confirm that the amendments to the proposed development will not result in any additional significant adverse impacts on the environment.

Please note that this EIAR Addendum Report is not a standalone document and should be read in conjunction with the further information response documentation, the planning application documentation and Environmental Impact Assessment Report submitted to Kildare County Council on the 2nd October 2025.

2.0 PROJECT DESCRIPTION AND ALTERNATIVES

2.1 Introduction

This section of the EIAR Addendum Report provides a brief overview of the revisions to the proposed scheme in response to the FI request and should be read in conjunction with Chapter 2 of the EIAR. It presents a description of the development as initially submitted to Kildare County Council on the 2nd October 2025 and a description of the main changes arising from the applicant's response to the further information request.

2.2 Description of Project as Originally Proposed

The following section provides a brief description of the proposed development as initially set out in the planning application documentation submitted to Kildare County Council on the 2nd October 2025. For a full description of the development as originally proposed please refer to the previously submitted documentation and in particular to Chapter 2 of the Environmental Impact Assessment Report.

In summary, the proposed development as originally detailed in the documentation previously submitted to Kildare County Council can be described as follows:

"The proposed development will consist of 581 no. residential units, a neighbourhood centre and all associated development, on a site of approximately 15.27 hectares.

The residential component of the development consists of 185 no. apartment / duplex apartments and 396 no. houses to be provided as follows:

- *59 no. 2 bed two storey mid terraced houses;*
- *52 no. 3 bed two storey mid terrace houses;*
- *223 no. 3 bed two storey end terrace/semi-detached houses;*
- *58 no. 4 bed two storey semi-detached houses;*
- *4 no. 4 bed two storey detached houses;*
- *185 no. duplex apartments / apartments (53 no. 1 beds, 92 no. 2 beds, 40 no. 3 beds) in a series of 3 to part 6 storey duplex apartment blocks / apartment blocks.*

The proposed neighbourhood centre consists of 3 no. buildings (Block A, Block B and a single storey standalone café / restaurant kiosk building) and a new public plaza and communal open space. Block A is part 5 storey / part 6 storey building comprising health centre (174 sq.m) and two no. shop units (124 sq.m pharmacy and 166 sq.m convenience shop) at ground floor level and 41 no. apartments (17 no. 1 beds and 24 no. 2 beds) from first to fifth floor level. Block B is a 5 storey building block comprising a childcare facility (762 sq.m) at ground floor level and 48 no. apartments (21 no. 1 beds and 27 no. 2 beds) from first to fourth floor level.

96 no. duplex apartments units (12 no. 1-bed, 48 no. 2-bed, and 36 no. 3-bed units) are provided in 5 no. blocks (Blocks 1 to 5) ranging from 3 no. storeys to 5 no. storeys. All duplex apartments and apartment units are provided with a balcony, terrace or private garden on all elevations.

A total of 888 no. surface car parking spaces are proposed for residential units, visitor parking and the neighbourhood centre commercial uses. A total of 623 no. cycle spaces are proposed for long stay/residents, 42 no. spaces for the neighbourhood centre commercial uses and 93 no. short stay/visitor cycle parking spaces.

The proposal includes significant public open space including a new Local Park, linear park and pocket parks, children's play areas and ancillary play area for the childcare facility. The development includes hard and soft landscaping, lighting, boundary treatments and communal open space areas.

The proposed development provides for two no. vehicular accesses from the permitted Maynooth Eastern Ring Road (MERR), including a new pedestrian/cyclist signalised crossing, associated internal roads, pedestrian and cycle infrastructure, set down areas, bin and bike stores, paths and access points provided up to the application site boundary to provide for potential future connections to adjoining lands to the north and south.

The development includes foul and surface water drainage, 6 no. ESB Substations, green roofs, PV panels, plant, services and all associated and ancillary site works and development.

An Environmental Impact Assessment (EIAR) and Natura Impact Statement (NIS) has been prepared for the development and accompanies the planning application."

As the Environmental Impact Assessment Report submitted with the initial application documentation demonstrated, subject to appropriate mitigation measures, the proposed development as described above was designed to ensure that it would have any significant adverse impacts on the environment.

2.3 Amendments to Project Arising from Response to FI Request

As stated above, after an initial review of the application documentation, Kildare County Council issued a request for further information dated the 25th November 2025. This request contained a total of 11 separate points which sought clarification / additional detail.

In order to comprehensively address all of the issues raised in the request for Further Information, it was necessary to make a number of amendments to the development as described in the initial planning application documentation. For full details of the amendments please refer to the Further Information Request documentation which this EIAR Addendum Report accompanies. In summary, the key amendments arising out of the further information request which are of relevance to the EIAR are as follows:

- A range of new three-storey house types (Types L, La, Q, Qa, S1 and S2) has been introduced to deliver a stronger urban edge to the park and improve enclosure and passive surveillance.
- New own-door Type 4H maisonette units have been incorporated, enhancing housing mix while contributing to increased density in a low-rise form.
- The Duplex Type A townhouse typology has been reconfigured, with improved layouts, increased separation distances between duplex blocks, enhanced elevation fenestration and removal of balcony railings.
- The alterations above have resulted in an increase of 8 no. units to provide a total of 589 no. residential units, comprising 369 no. houses and 220 no. apartments / duplex units.
- The residential mix has been updated to increase density in appropriate locations, particularly around the main public open space (cells 3, 4, 5, 6 and 7), achieving an overall density of c. 39.45 units per hectare.
- Block A within the Neighbourhood Centre has been reoriented by 90 degrees to align with Block B, improving urban structure, legibility and frontage to streets and public spaces.
- The previously proposed standalone café kiosk has been omitted, with café and community uses rationalised within a new site services building within the Local Park.
- Reconfiguration of the commercial uses within Block A of the neighbourhood centre and provision of a 136 sq.m community space.

- The architectural approach to gateway buildings has been simplified, with the removal of tower projections and the introduction of higher-quality finishes.
- Public open spaces have been comprehensively reconfigured and upgraded, providing clearer definition, improved usability, enhanced active and passive recreational provision, and stronger integration with surrounding development.
- The Local Park (POS 1) has been formalised and enhanced, with increased activity and overlooking from surrounding development, upgraded play and sports facilities (including MUGAs, calisthenics and skate facilities), improved entrances and boundaries, and the introduction of a new c. 90 sq.m public maintenance and amenity building to support long-term park management.
- The linear public open space / linear park has been reconfigured and enhanced, with increased width and clearer definition, stronger landscape structure and planting, improved integration with adjacent development, reconfigured SuDS features to improve usability and visual quality, and strengthened connectivity between neighbourhoods and the main park.
- A revised SuDS and biodiversity-led landscape strategy has been implemented across all public open spaces, integrating wetlands, swales, detention areas and microhabitats in a manner that enhances amenity, biodiversity and long-term functionality.
- The access and junction strategy has been refined to confirm that all traffic signals, junction works and associated infrastructure serving the development are fully contained within the applicant's red line boundary, with direct tie-in to the approved MERR scheme without requiring any modification.

It is respectfully submitted that the revised proposals provide a suitable response to all the items raised by the Planning Authority in the FI request and results in a suitable form of residential development on the subject site which accords with the proper planning and sustainable development of the area please refer to the FI Cover Letter prepared by JSA for further details.

2.4 Alternatives Considered

As well as providing a detailed description of the proposed development, Chapter 2 of the EIAR outlined how the submitted design evolved through various options considered, resulting in an optimal form of development in terms of providing a significant amount of high quality housing units to help meet current housing needs in a sustainable and planned manner, while addressing predicted environmental impacts.

The applicant's comprehensive response to the Further Information request from Kildare County Council represents the final and definitive stage in the evolution of the project. It is considered that the proposed amendments, which were themselves subject to detailed analysis and review by the project team, and consultation with the Planning Authority, have resulted in overall further improvements to the scheme.

Figure 2.1: Site Layout as Originally Proposed

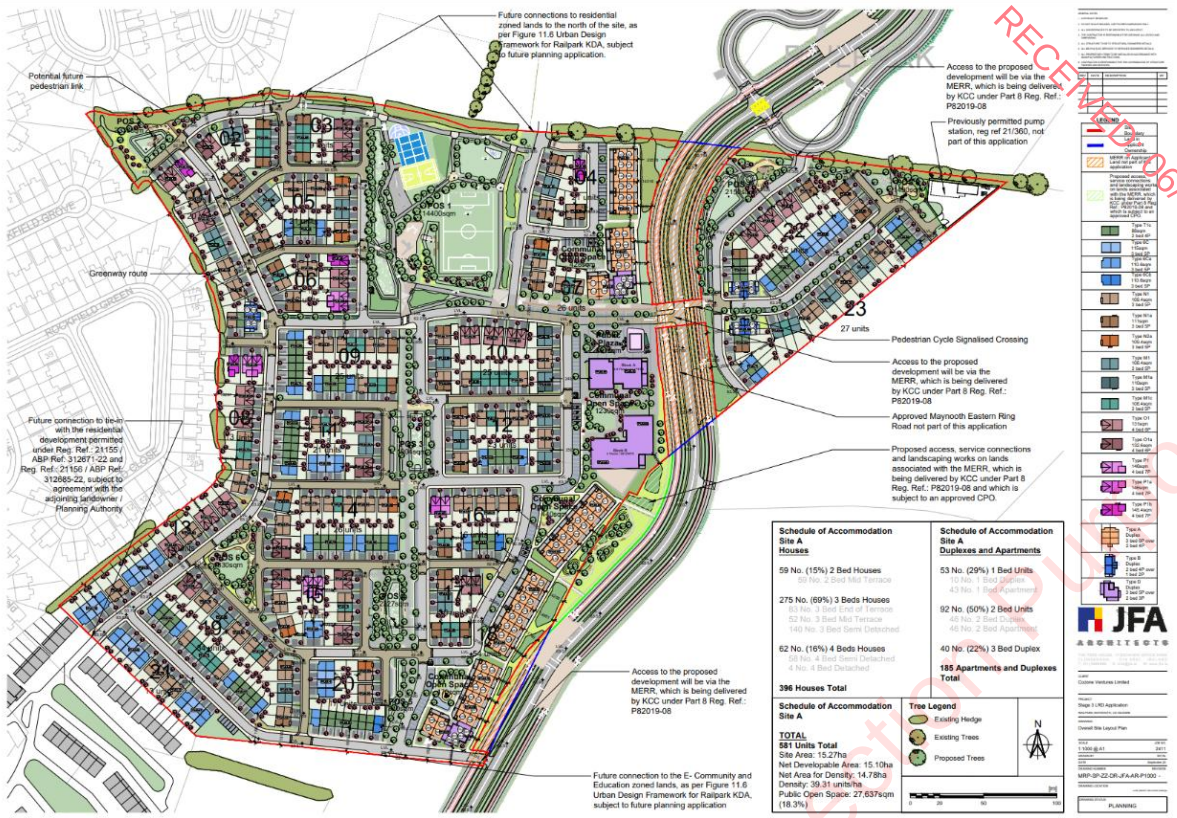
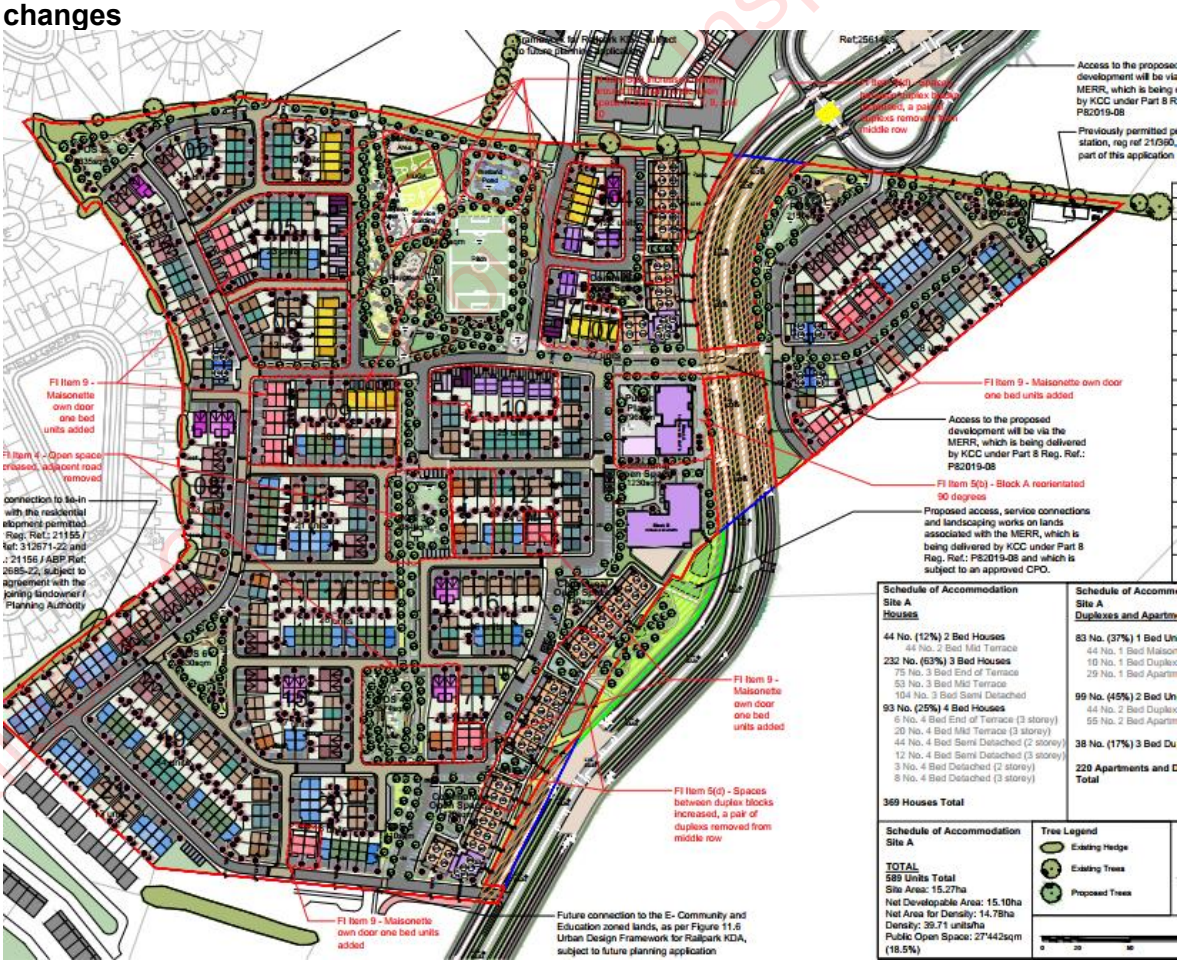


Figure 2.2: Site Layout as Amended in Response to FI Request, with summary notes of key changes



2.5 Potential Environmental Impacts of Amended Scheme

This EIAR Addendum Report has been prepared to include updates to or complete updated versions, and appendices, of the following chapters of the EIAR:

- Chapter 3- Population and Human Health
- Chapter 4- Archaeology, Architectural and Cultural Heritage
- Chapter 11- Climate
- Chapter 16- Mitigation Monitoring

This ensures that the issues raised in Item 10 and 11 of the Further Information Request are fully addressed and mitigation measures have been removed, amended or incorporated where relevant. This EIAR Addendum Report should be read in conjunction with all the documentation accompanying the FI response and the main EIAR document submitted to Kildare County Council on the 2nd October 2025.

3.0 POPULATION AND HUMAN HEALTH

The Further Information response is accompanied by an updated Chapter 3 - Population and Human Health prepared by John Spain Associates (included as Appendix 1), which fully addresses the points raised in Item 10 of the Further Information request in relation to Population and Human Health and we provide a summary below for ease of reference.

Chapter 3 of the EIAR has been updated to reflect the HSE NEHS comments during the public observation period on the LRD application regarding the omission of relevant literature, including the National Adaptation Framework 2024, the Kildare County Council Climate Action Plan 2024-2029, and the Healthy Ireland Framework 2019-2025. The updated chapter explicitly recognises that climate change represents a key determinant of human health and considers the potential impacts of climate-related hazards, including extreme heat, storms, and other severe weather events, on both the construction and operational phases of the development.

The proposed development has been assessed with reference to the Healthy Ireland vision, ensuring that the design and layout of the scheme contribute to the creation of a healthy and resilient place for residents. In particular, the assessment highlights the contribution of high-quality public and communal open space, accessible pedestrian and cycling routes, and the provision of a childcare facility and health centre to the physical and mental wellbeing of the community.

Construction phase impacts have been reviewed in light of these updates. Potential short-term public health risks associated with noise, dust, traffic, and climate-related events have been assessed. Associated mitigation measures have been incorporated within Chapter 16: Mitigation Measures. An updated Outline Construction Management Plan has not been submitted as part of this Further Information response, as this is not considered necessary at this stage and will instead be provided pursuant to a prior-to-commencement planning condition. The chapter also highlights the temporary nature of any residual impacts and the measures in place to ensure the safety and health of construction workers and the local population.

For the operational phase, the chapter demonstrates that the proposed development will support the health and wellbeing of future residents through the provision of well-designed housing, safe and connected streets and public spaces, and facilities that support community interaction and active lifestyles. Climate-adaptive measures incorporated into the site, including landscaping and open space provision, further enhance resilience to potential hazards.

The updated Population and Human Health chapter demonstrates that the amendments made in response to Items 10 of the Further Information Request do not give rise to any new significant adverse effects. On the contrary, the proposed development is now better aligned with national and local policies relating to public health, climate resilience, and the Healthy Ireland Framework.

Please refer to the updated Chapter 3- Population and Human Health for a full account of the assessment and proposed mitigation measures.

4.0 ARCHAEOLOGY, ARCHITECTURAL AND CULTURAL HERITAGE

The Further Information response is accompanied by an updated Chapter 4 - Archaeology, Architectural and Cultural Heritage prepared by Archaeological Consultancy Services Unit (included as Appendix 2), we provide a summary below for ease of reference.

The Archaeology, Architectural and Cultural Heritage chapter of the EIAR has been updated to incorporate the results of archaeological test trenching undertaken on the site following submission of the original Large-scale Residential Development (LRD) application. While Items 10 and 11 of the Further Information request did not specifically relate to archaeology, architectural or cultural heritage, it was considered appropriate and necessary to update the EIAR to reflect the outcome of the post-submission archaeological investigations and to ensure that the assessment is fully informed by the most up-to-date baseline data.

The test trenching was undertaken in accordance with the archaeological mitigation strategy set out in the original EIAR, following an Archaeological Impact Assessment and geophysical survey, and was carried out under licence from the Department of Housing, Local Government and Heritage (Excavation Licence No. 25E0711). The objective of the works was to further clarify the archaeological potential of the site, investigate anomalies identified during geophysical survey, and identify any subsurface archaeological remains that could be affected by the proposed development, in order to inform appropriate mitigation measures.

A programme of 51 test trenches was excavated across the site. The majority of the site was confirmed to be of low archaeological potential, with no archaeological remains identified in most trenches, including in the areas corresponding with two geophysical anomalies (M1 and M2) initially interpreted as possible ring-ditches. However, a limited number of archaeological features of significance were identified in three locations (Trenches 43, 45 and 53). These comprise a circular ring-ditch (C4301), a masonry structure interpreted as stone walls or a possible lime-related structure (C4501), two additional ring-ditches (C5301 and C5302, the latter with a possible extension C5304), and four human inhumation burials (C5303, C5305, C5306 and C5307). No previously unknown recorded monuments or large-scale archaeological complexes were identified, and no archaeological remains were identified within the footprint of a potential historic road shown on historic mapping.

The updated assessment confirms that the proposed development will not result in any impacts on recorded archaeological monuments, protected structures or architectural heritage assets, as none are located within the site and no indirect or visual impacts on nearby recorded monuments are predicted. However, the proposed development would have a direct, negative and permanent impact on the archaeological features identified during the test trenching if unmitigated.

In accordance with best practice and National Monuments Service guidance, preservation by record is proposed for all identified archaeological features, as preservation in situ is not warranted having regard to the nature of the features identified and not feasible due to the nature and layout of the proposed development. This will involve full archaeological excavation in advance of construction, carried out by a licence-eligible archaeologist under licence from, and in consultation with, the National Monuments Service. In addition, given the scale of the site and the possibility that further isolated or small-scale archaeological remains may be present beyond the areas tested, archaeological monitoring of all topsoil stripping during the construction phase is proposed, including areas not previously accessible for test trenching.

The updated chapter also includes revised figures and mapping illustrating the extent of archaeological investigations, the location of identified features, and the proposed mitigation strategy. All mitigation measures will be incorporated into the Construction Environmental Management Plan, which will be updated and submitted to the Planning Authority prior to commencement of development.

In conclusion, while additional archaeological features have been identified since submission of the original EIAR, the updated Archaeology, Architectural and Cultural Heritage chapter confirms that, subject to the implementation of the proposed mitigation measures, the development can proceed without giving rise to significant residual adverse effects on archaeological, architectural or cultural heritage resources.

Please refer to the updated Chapter 4- Archaeology, Architectural and Cultural Heritage for full details of the test trenching methodology, results and mitigation measures.

11.0 CLIMATE

The Further Information response is accompanied by an updated Chapter 11 - Climate prepared by DNV Environmental Consultants (included as Appendix 3), which fully addresses the points raised in Item 11 of the Further Information request in relation to Climate and we provide a summary below for ease of reference.

The updated chapter provides an enhanced assessment of climate change adaptation and resilience during both the construction and operational phases of the proposed development, with particular emphasis on the protection of population and human health and alignment with Objective DO1.4 of the Maynooth and Environs Joint Local Area Plan 2025-2031.

In respect of the construction phase, the revised chapter now identifies a wider range of climate-related hazards, including prolonged dry spells, heatwaves, extreme rainfall events, high winds and storm conditions, in addition to flooding. The assessment recognises the potential for indirect effects on population and human health, such as dust generation from exposed soils and stockpiles during dry conditions. Additional mitigation measures have therefore been identified, including dust suppression, appropriate management and stabilisation of soil stockpiles, and the use of vegetation or other surface treatments where feasible to reduce dust mobilisation during extended dry periods. These measures will be implemented through the Construction Environmental Management Plan (CEMP) which will be updated and submitted to the Planning Authority prior to commencement of development.

In relation to the operational phase, the updated assessment places increased emphasis on climate adaptation measures that protect population health. This includes the provision of green infrastructure, tree planting and landscaped open spaces to provide shade, cooling and shelter during periods of elevated temperatures, as well as the delivery of green and blue spaces that contribute to reducing the urban heat island effect and support mental wellbeing. The surface water drainage strategy, incorporating Sustainable Urban Drainage Systems (SuDS), has also been confirmed as being designed with appropriate allowances for climate change, ensuring resilience to increased rainfall intensity and volumes over the lifetime of the development.

The updated Climate chapter also more clearly demonstrates how the location, design and layout of the proposed development contribute to the delivery of Objective DO1.4 of the Maynooth and Environs Joint Local Area Plan 2025-2031. In this regard, the development supports climate neutrality through the mitigation of greenhouse gas emissions via energy-efficient building design, the delivery of Nearly Zero Energy Buildings (NZEB), integration of renewable energy technologies and the promotion of sustainable transport modes. In parallel, the incorporation of nature-based solutions, including SuDS, green infrastructure and landscaped open spaces, supports biodiversity enhancement, climate resilience and the creation of a high-quality living environment.

With the incorporation of the updated mitigation and adaptation measures, the conclusions of the Climate chapter remain unchanged. The proposed development is assessed as being resilient to identified

climate change hazards, with potential impacts on climate and population health appropriately avoided or mitigated, and no significant adverse effects predicted.

Please refer to the updated Chapter 11- Climate, for full details of the revised climate assessment, including climate adaptation and resilience measures, mitigation and monitoring proposals.

16.0 SUMMARY OF EIAR MITIGATION AND MONITORING MEASURES

This section of the EIAR Addendum Report sets out the revised mitigation and monitoring measures arising from the applicant's response to the Further Information request issued by Kildare County Council, together with the findings of post-submission assessments and investigations. The mitigation measures presented herein update, refine and, where necessary, supplement those contained in the original EIAR to ensure that all potential environmental effects associated with the amended development proposals are appropriately avoided, reduced or managed.

Please refer to the updated Chapter 16- Summary of EIAR Mitigation and Monitoring Measures (Appendix 4), for full details of the final updated summary of the proposed EIAR Mitigation and Monitoring Measures.

Revised Mitigation for Chapter 4 – Archaeology, Architectural and Cultural Heritage

Pre-Construction Phase

Mitigation will be required in the form of preservation by record (fully excavated by hand), with the use of a metal detector, of three areas where archaeological activity was identified during test trenching. This must take place prior to any construction works commencing in these areas. They comprise a ring-ditch (C4301) in the area of Trench 43, a masonry and lime structure (C4501) in the area of Trench 45 and four inhumation burials (C5303, C5305, C5306, C5307), a ring-ditch (C5302) with an extension (C5304) and a curvilinear feature/possible ring-ditch (C5301) in the area of Trench 53. Additional archaeological remains may be uncovered when these areas are fully topsoil stripped under direct archaeological supervision.

The excavations will be carried out by a licence-eligible archaeologist in consultation with and under licence from the National Monuments Service of the Department of Housing, Local Government and Heritage.

Adequate time and resources will be provided by the developer for the resolution of any archaeology identified during the excavation of the above areas. Time and resources will also be allowed for any post-excavation work and specialist analysis necessary following the archaeological excavation of these sites.

It is required to compile a report on all findings on completion of the excavations, and this will be submitted to the relevant authorities.

Construction Phase

Mitigation will be required in the form of archaeological monitoring, with the use of a metal detector, of all topsoil removal associated with the development during the construction phase. This includes the areas adjacent and east of the Maynooth Eastern Relief Road (MERR) that were not accessible for test trenching due to the temporary storage of topsoil. The use of appropriate machinery to ensure the preservation and recording of any surviving archaeological remains will be necessary.

This monitoring will be carried out by a licence-eligible archaeologist in consultation with and under licence from the National Monuments Service of the Department of Housing, Local Government and Heritage. Accordingly, no ground disturbance will take place in the absence of the Archaeologist without his/her express consent. Should any significant archaeological features be discovered, further

archaeological mitigation may be required, such as preservation by record (excavation). Any further mitigation will require approval from the NMS.

Adequate time and resources will be provided by the developer for the resolution of any archaeology identified within the development site during the construction phase and which will be directly impacted by groundworks. Time and resources will also be allowed for any post-excavation work and specialist analysis necessary following any excavation that takes place.

It is required to compile a report on all findings on completion of the monitoring and/or excavation, and this will be submitted to the relevant authorities.

Revised Mitigation for Chapter 11- Climate

Pre-Construction Phase

Mitigation will be implemented through the preparation of an updated Construction Environmental Management Plan (CEMP) to be submitted to the Planning Authority prior to commencement of development, which will incorporate climate adaptation and resilience measures relevant to anticipated climate-related hazards. The CEMP will identify risks associated with extreme weather events, including prolonged dry spells, heatwaves, extreme rainfall and storm conditions, and will set out appropriate response and management measures to minimise environmental and population health effects.

The CEMP will include procedures for the management of soil stockpiles and exposed surfaces during dry conditions to limit dust generation, including surface stabilisation measures, damping-down where required, and the use of temporary vegetation or other suitable coverings where practicable.

Construction Phase

During the construction phase, mitigation measures will be implemented to address climate-related hazards and protect population health. These will include dust suppression measures during dry and windy conditions, appropriate storage and management of excavated materials, and monitoring of weather conditions to allow construction activities to be adapted in response to extreme events.

Measures to protect workers and nearby residents during periods of elevated temperatures will be implemented, including the provision of shaded rest areas, appropriate scheduling of works during extreme heat events, and adherence to relevant health and safety guidance.

Surface water management measures will be implemented in accordance with the approved drainage design to ensure resilience to intense rainfall events, including the use of temporary drainage controls and sediment management measures to prevent flooding, erosion and pollution during construction.

All construction phase mitigation measures relating to climate adaptation and resilience will be monitored and enforced through the CEMP.

Operational Phase

Mitigation during the operational phase will be delivered through the design and layout of the development and will include measures to enhance climate resilience and protect population health over the lifetime of the development.

These measures include the provision of green infrastructure, tree planting and landscaped open spaces to provide shade, cooling and shelter, thereby reducing exposure to heat stress and contributing to the mitigation of the urban heat island effect. The incorporation of green and blue infrastructure will also support mental wellbeing and overall quality of life for future residents.

The surface water drainage system, incorporating Sustainable Urban Drainage Systems (SuDS), will operate with appropriate allowances for climate change to ensure resilience to increased rainfall intensity and volumes, reducing flood risk and protecting downstream receiving waters.

Energy efficiency measures, including Nearly Zero Energy Building (NZEB) standards, renewable energy technologies and sustainable transport infrastructure, will contribute to the reduction of greenhouse gas emissions and support national and local climate objectives, including Objective DO1.4 of the Maynooth and Environs Joint Local Area Plan 2025-2031.

Monitoring

Monitoring of climate-related mitigation measures will be undertaken through the implementation of the CEMP during construction and through the ongoing management and maintenance of landscaped areas, SuDS features and building services during the operational phase. This will ensure that climate adaptation and resilience measures remain effective for the lifetime of the development.

APPENDIX 1:

CHAPTER 3
POPULATION AND HUMAN HEALTH

3.0 POPULATION AND HUMAN HEALTH

This Chapter has been revised and updated to take account of the matters raised under Item 10 of the Request for Further Information issued by Kildare County Council dated 25th November 2025 in respect to KCC Reg. Ref.: 25/61119, and any associated amendments arising out of the FI request.

3.1 INTRODUCTION

The 2014 EIA Directive (2014/52/EU) updated the list of topics to be addressed in an EIAR and has replaced 'Human Beings' with 'Population and Human Health'. This chapter also meets the requirement for assessment of 'Human Beings' as per Schedule 6 of the Planning and Development Regulations 2001 (as amended).

This chapter of the EIAR was prepared by Tiarna Devlin, BA, MRUP, MRTPI, MIPI and Anton O'Neill, MPLAN, MRTPI, and approved by Paul Turley, Managing Director, BA, MRUP, Dip Environmental & Planning Law, MIPI, of John Spain Associates, Planning and Development Consultants. In preparing this chapter we have regard to the other inputs to this EIAR and the planning application, in particular the chapters addressing Air Quality, Noise and Vibration and Traffic and Transport, and the separate reports addressing Operational Waste Management prepared by DNV and Outline Construction Waste Management and the Outline Construction & Environmental Management Plan prepared by ROD.

Population and Human Health comprise an important aspect of the environment to be considered. Any significant impact on the status of human health, which may be potentially caused by a development proposal, must therefore be comprehensively addressed.

Population and Human Health is a broad ranging topic and addresses the existence, activities and wellbeing of people as groups or 'populations'. This chapter of the EIAR document concentrates on those topics which are manifested in the environment, such as new land uses, more buildings or greater emissions. The EIAR identifies, describes and assesses in an appropriate manner, in light of each individual case, the direct and indirect significant effects of a project on population and human health.

3.2 STUDY METHODOLOGY

At the time of writing there is no specific guidance from the EU Commission on the 2014 EIA Directive to indicate how the new term 'Human Health' should be addressed. Therefore, this chapter of the EIAR document has been primarily prepared with reference to recent national publications which provide guidance on the 2014 EIA Directive including the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2018) and the Guidelines on the information to be contained in Environmental Impact Assessment Reports, published by the EPA in May 2022.

The preparation of this chapter also has regard to the guidance published by the European Commission in 2017 on the preparation of EIARs (taking account of the changes introduced under the 2014 Directive). The European Commission guidance states the following in relation to the assessment of Human Health:

"Human health is a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances

to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population."

EU Commission's SEA Implementation Guidance from 2003 gives an indication of how 'Human Health' should be considered in terms of environmental assessment and notes:

"The notion of human health should be considered in the context of the other issues mentioned [in the list of factors to be identified, described and assessed] and thus environmentally related health issues such as exposure to traffic noise or air pollutants are obvious aspects to study." (para 5.26).

In accordance with this approach to Human Health espoused in the Commission Guidance, this chapter addresses human health in the context of other factors addressed elsewhere in further detail within the EIAR where relevant. Relevant factors identified include inter alia water, air quality, noise, and the risk of major accidents and disasters.

The 2018 EIA Guidelines published by the Department of Housing, Planning and Local Government (DHPLG) state that there is a close interrelationship between the SEA Directive and the 2014 EIA Directive. The Guidelines state that the term 'Human Health' is contained within both of these directives, and that a common interpretation of this term should therefore be applied.

In addition, the assessment has had regard to the principles of the Healthy Ireland Framework 2019-2025, which provides a national policy context for promoting health and wellbeing through the creation of supportive physical, social and environmental conditions. The Healthy Ireland vision seeks to ensure that health and wellbeing are embedded across all sectors and at all stages of decision-making, recognising that the quality of the built environment can play a significant role in shaping physical and mental health outcomes. In this context, the proposed development has been designed and assessed in the context of its potential to contribute to the creation of a healthy living environment, through factors such as access to services, quality of residential amenity, environmental quality, and the mitigation of potential environmental health risks.

Climate change is recognised internationally and nationally as one of the greatest threats to global population health in the 21st century, with impacts arising through increased frequency and intensity of extreme weather events, heat stress, flooding, effects on air quality, disruption to infrastructure, and indirect effects on mental health and community wellbeing. This assessment has therefore had regard to the National Adaptation Framework 2024, the Kildare County Council Climate Action Plan 2024–2029 and the Healthy Ireland Framework, which collectively emphasise the need to embed health resilience and adaptation considerations into spatial planning and development.

This assessment also has due regard to the Climate Action Plan 2025, which is the fourth annual update to Ireland's Climate Action Plan 2019 and the third to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021. It builds on the introduction of carbon budgets and sectoral emissions ceilings in Climate Action Plan 2023 and sets a course for Ireland's targets to halve emissions by 2030 and reach net-zero no later than 2050.

In line with the Healthy Ireland Framework, this chapter adopts a health-centred approach to assessment, recognising that land-use planning, housing quality, access to services, transport choice, green infrastructure and environmental quality are key determinants of population health. Accordingly, the assessment considers whether the proposed development contributes to the delivery of a healthy place that supports physical activity, mental wellbeing, social connection and long-term community resilience.

To establish the existing receiving environment / baseline, several site visits were undertaken by the EIAR consultancy team to appraise the location and likely and significant potential impact upon human receptors of this proposed development. A desk based study of published reference documents such as Central Statistics Office Census data, the ESRI Quarterly Economic Commentary, the Regional Spatial and Economic Strategy for the Eastern and Midlands Regional Assembly 2019 and the Kildare Development Plan 2023-2029, and the Maynooth and Environs Joint Local Area Plan 2025-2031 has also be carried out.

It is noted that there are numerous inter-related environmental topics described throughout the EIAR document which are also of relevance to Population and Human Health. Issues such as the potential likely and significant impacts of the proposed development on townscape and visual impact, daylight and sunlight, archaeology and cultural heritage, air quality and climate, noise and vibration, water, land and soils, material assets including traffic and transport impacts, are of intrinsic direct and indirect consequences to human health. The daylight and sunlight assessment and microclimate / wind assessment of the proposed development is a separate matter to the EIAR and is addressed in standalone reports prepared by GIA accompanying the application.

The Guidelines on the information to be contained in Environmental Impact Assessment Reports, published by the EPA states that '*in an EIAR, the assessment of impacts on population & human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc'.*

In addition to EIA and SEA guidance, the assessment of Population and Human Health has had regard to national and local climate adaptation policy, including the National Adaptation Framework 2024 and the Kildare County Council Climate Action Plan 2024–2029. These documents recognise that climate change represents a significant and growing risk to population health, through increased exposure to extreme weather events, heat stress, flooding, and indirect effects on environmental quality and infrastructure resilience. In this context, the assessment of Population and Human Health considers not only existing environmental conditions, but also the sensitivity of human receptors to climate-related environmental stressors, as addressed through the relevant environmental topics elsewhere in the EIAR, and in particular the updated Chapter 11- Climate included with this FI Response.

This chapter of the EIAR document focuses primarily on the potential likely and significant impact on Population, which includes Human Beings, and Human Health in relation to health effects/issues and environmental hazards arising from the other environmental factors. Where there are identified associated and inter-related potential likely and significant impacts which are more comprehensively addressed elsewhere in this EIAR document, as discussed above, these will be referred to. The reader is directed to the relevant environmental chapter of the EIAR document for a more detailed assessment. The implementation of the range of remedial and mitigation measures to be included throughout the EIAR document are considered to effectively limit any likely adverse environmental impacts of the construction and operational phase of the proposed development on Human Beings. No significant health and safety effects are envisaged during either the construction or operational phases of the proposed development.

The Health and Safety policy, procedures and work practices of the proposed development will conform to all relevant health and safety legislation both during the construction and operational stages of the proposed development. The proposed development will be designed and constructed to best industry standards, with an emphasis being placed on the health and safety of employees, local residents and the community at large. It is not envisaged that detrimental effects on human health will be suffered by those living adjacent to the development during both the construction and operational phase of the development. Furthermore, the proposed development will result in several positive impacts, some of which are significant. These include inter alia a significant positive economic impact during both the construction and operational phases of the proposed development, along with positive impacts on the land use and settlement patterns, employment and social patterns.

3.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

3.3.1 Introduction

A description of the relevant aspects of the current state of the environment (baseline scenario) in relation to population and human health is provided below. Specific environmental chapters (water, noise and vibration, air quality, climate) in this EIAR provide a baseline scenario relevant to the environmental topic being discussed.

Therefore, the baseline scenario for separate environmental topics is not duplicated in this section; however, in line with guidance provided by the European Commission, the EPA and the DHPLG, the assessment of impacts on population and human health refers to those environmental topics under which human health effects might occur, e.g. noise, water, air quality etc. An outline of the likely evolution without implementation of the project as regards natural changes from the baseline scenario is also provided. This is the “Do Nothing” scenario.

The existing environment is considered in this section under the following headings:

- Economic & Employment Activity;
- Social Patterns;
- Land Use and Settlement Patterns;
- Housing
- Health & Safety;
- Risk of Major Accidents and Disasters.

The application site has a total area of c. 15.27 hectare and is located on the eastern side of Maynooth, south of the Dublin-Sligo railway line and the Royal Canal, in an area known as Railpark, as illustrated in Figure 2.1 below. The site is approximately 1.65 km east of the town centre and 1.5 km from Maynooth rail station (via Celbridge Road) and is currently in agricultural use (see Figure 3.1), but forms part of the designated ‘Key Development Area – Railpark’ in section 11.4.1 of the Maynooth and Environs Joint Local Area Plan 2025-2031. The subject site is zoned C(2) for new residential development with a small portion of the lands zoned N for Neighbourhood Centre as outlined on Map 11.1 of the JLAP.

Figure 3.1: Site Location (Red line Indicative Boundary)

Source: Goggle Maps

The site is to the east of established residential neighbourhoods at Parklands and Rockfield. The site is located to the northeast of the residential development 'The Grange' permitted under Reg. Ref.: 21155 / ABP Ref: 312671-22 (Phase 1) and Reg. Ref.: 21156 / ABP Ref: 312685-22 (Phase 2), which is currently under construction. Maynooth Educate Together National School on Celbridge Road is located approximately 230 metres to the south and Gaelscoil Uí Fhiaich is located approximately 250 metres to the south across Celbridge Road.

There are hedgerows along the northern and western boundaries of the site, the northern hedgerow being the most complete. The hedgerow along the western boundary with Rockfield is fragmented with many gaps where vegetation has been removed. There are ornamental trees and hedging planted in adjoining gardens intermingled with the hedgerow. There is also a hedgerow running north-south through the site and along the southeastern corner.

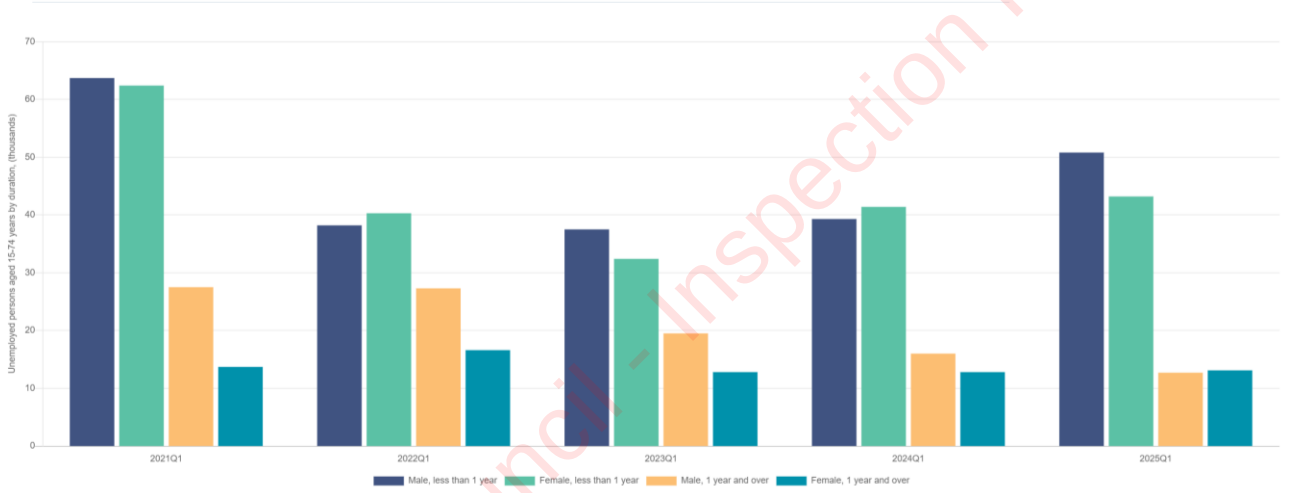
The subject site is serviced by a bus connects route located to the south of the site along Celbridge Road (R405), which includes bus route C4 / C6 from Maynooth to Ringsend Road, Dublin 4. The new W6 orbital route is also serviced from this bus stop, located less than 200m from the south of the subject site which connects Maynooth to Celbridge, Newcastle and Tallaght.

The Maynooth Train Station is located is within 12-20 minutes of walking distance of the subject site and provides a frequent train services to Dublin Connolly Station. The train station is part of the Dart+ West programme which aims to modernise and improve existing rail services in the Greater Dublin Area, delivering frequent, modern, electrified services to Maynooth. The subject site is also within walking distance of the town centre with a large range of restaurants, cafes and other services/facilities such as churches, community centres, medical services and a library. There are a number of sports and recreational facilities available in proximity to the site, including Ace Fit Club, Harbour Field Park and Glenroyal Hotel and Leisure Club.

3.3.2 Economic & Employment Activity

The CSO's Labour Force Survey for Q1 2025 states that employment increased by 89,900 or 3.3% to 2,794,100 persons in the 12 months to Q1 2025 from 2,704,200 in Q1 2024. This reflects continued strengthening in labour market conditions and builds on the recovery in economic activity seen in recent years.

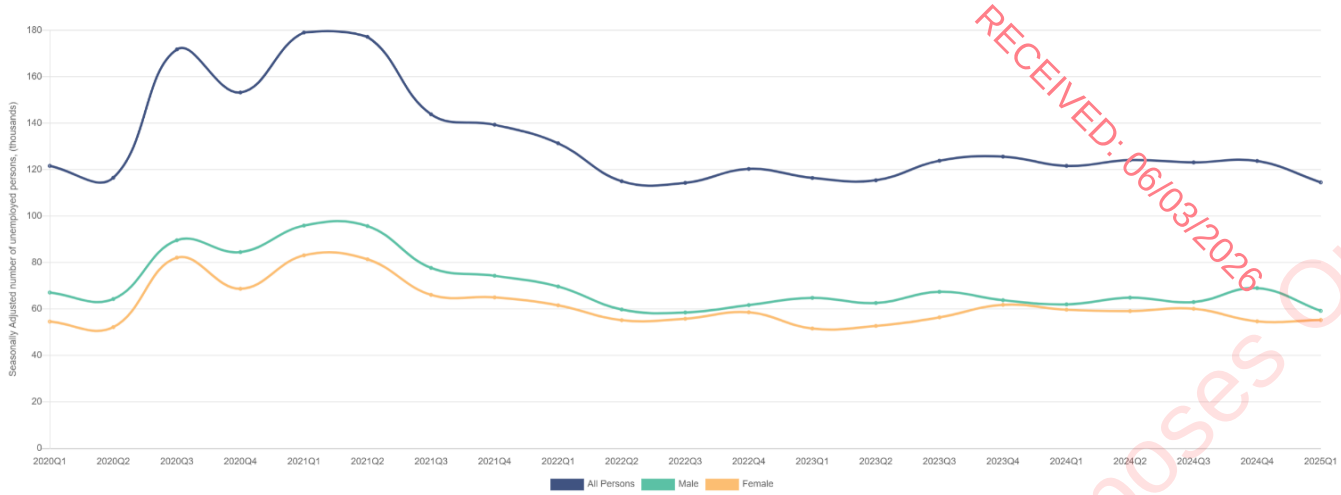
Figure 3.2: Unemployment during Q1 2021-Q1 2025



Source: [Unemployment Q1 2025 - CSO - Central Statistics Office]

The employment rate for those aged 15-64 rose to 74.7% in Q1 2025, up from 73.8% in Q1 2024 and 73.7% in Q1 2023. Simultaneously the unemployment rate for those aged 25-74 years was 3.6% in Q1 2025, up from 3.5% 12 months earlier. The total number of persons unemployed in this age group was 91,100, an increase of 6,400 people (+7.6%) from Q1 2024.

Figure 3.3: Unemployment rate for those aged 15-74 years by sex Quarter 1 2020 to Quarter 1 2025



Source: CSO [Unemployment Q1 2025 - CSO - Central Statistics Office]

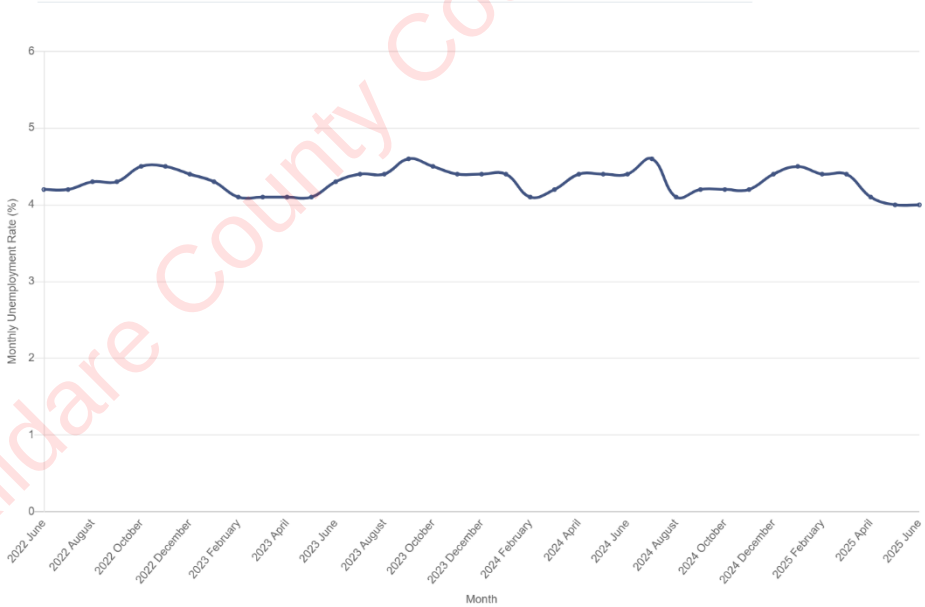
The CSO Monthly release (2nd July 2025) notes that:

"In June 2025, the seasonally adjusted unemployment rate was 4.0%, which was unchanged from the May 2025 rate. On an annual basis, the June 2025 unemployment rate of 4.0% was down from a rate of 4.4% in June 2024

The seasonally adjusted number of persons unemployed was 117,900 in June 2025, compared with 118,400 in May 2025. There was a decrease of 8,200 in the seasonally adjusted number of persons unemployed in June 2025 when compared with a year earlier.

The seasonally adjusted number of males unemployed rose to 61,300 in June 2025, compared with 60,700 in May 2025. In June 2025, the seasonally adjusted number of females unemployed fell to 56,600 from the 57,700 recorded in May 2025."

Figure 3.4: Seasonally Adjusted Monthly Unemployment Rate (ILO), June 2022 to June 2025



Source: [Monthly Unemployment June 2025 - CSO - Central Statistics Office]

The Economic and Social Research Institute (ESRI) Quarterly Economic Commentary for Spring 2025 notes that:

"At the start of 2025, the Irish economy is in a strong position. Unemployment stands at 3.9 per cent, while real income growth is set to exceed 3.5 per cent in the current year. As a baseline, modified domestic demand (MDD) is forecast to increase by 3.0 per cent in 2025 and by 2.8 per cent in 2026. These projections are based on the assumption that no trade tariffs are imposed between the United States and the European Union."

The ESRI Commentary outlines that "*the international climate remains particularly uncertain, with the incoming US administration signalling new tariffs that may disrupt global trade. In an alternative scenario where a 25 per cent bilateral tariff is introduced, MDD growth is projected to moderate to 2.8 per cent in 2025 and 2.1 per cent in 2026. The outlook is particularly sensitive to any targeting of pharmaceutical products, a key export for Ireland. Meanwhile, housing supply in 2024 was weaker than expected, with 30,330 units completed, raising concerns about sustained pressure on housing costs.*"

The above sources demonstrate that, while international uncertainties, particularly around US trade policy, may present downside risks, the Irish economy remains in a strong position for 2025. With unemployment at historically low levels (4.0% in June 2025) and real income growth projected to exceed 3.5%, the outlook for modified domestic demand remains positive, with baseline forecasts of 3.0% growth in 2025. Even under a more adverse global trade scenario, domestic demand is expected to hold up relatively well. This continued economic resilience, alongside increasing employment and rising incomes, is expected to drive further demand for housing, particularly in urban areas such as Dublin and urban growth towns like Maynooth, where housing supply continues to lag behind demographic and labour market pressures.

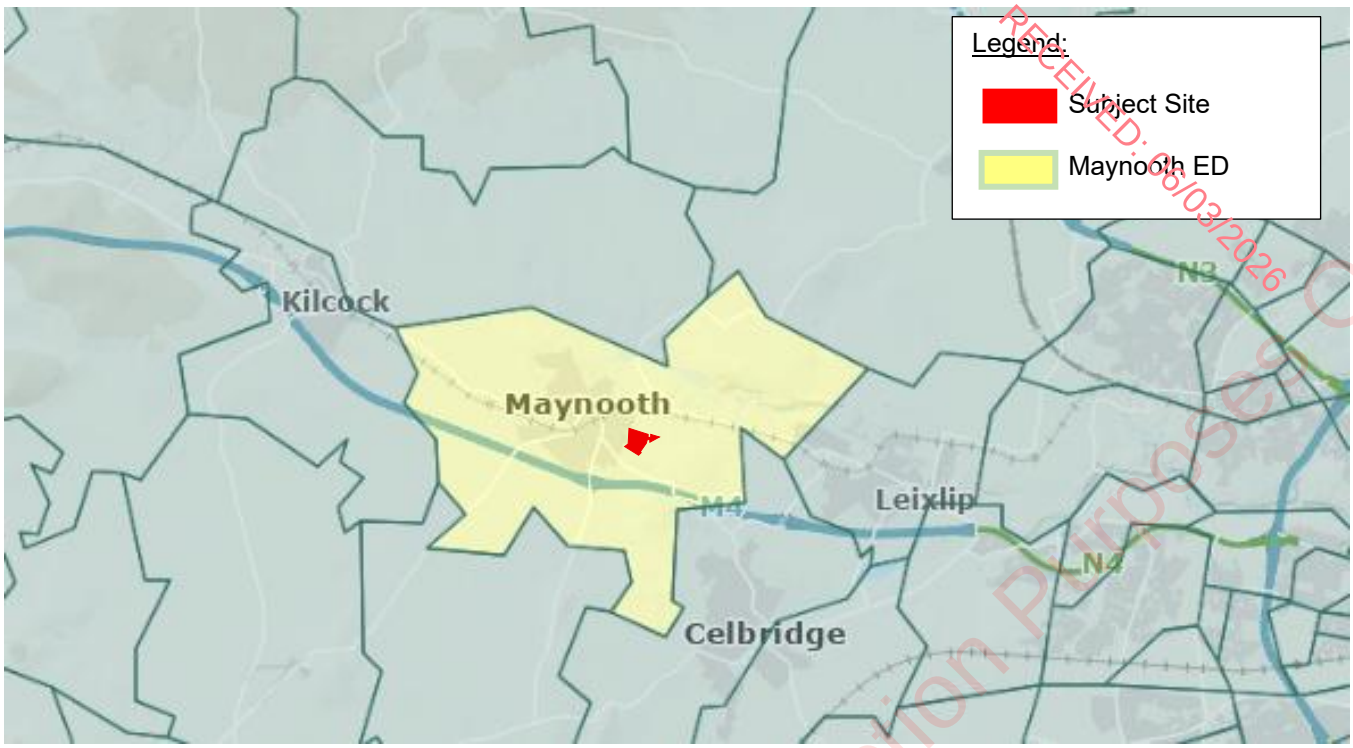
3.3.3 Social Patterns

For the purposes of this chapter, a review has been carried out of data from the 2011, 2016 and the 2022 Census of Population in order to identify any significant changes in population levels and age profile at national, regional, county, city and local levels. The 2022 Census results provides the most recent overview of the current population, employment and economic statistics and trends of the State.

The proposed development site at Railpark Maynooth, is situated within the Electoral Division (ED) of Maynooth as shown in Figure 3.5.

Table 3.1 indicates that the population of the state grew from approximately 4.5 million to 5.1 million between 2011 and 2022, representing an increase of 12.2% in 11 years. The population of the Greater Dublin Area increased by 15.4% (278,449 persons) over the same period while Kildare County grew by 17.8% (37,462 persons) between 2011 and 2022.

Figure 3.5: Image of the Maynooth electoral division indicating site location



Source: Central Statistics Office - Census 2022 Small Area Population Statistics

In particular, population growth within the wider study area of Maynooth Town rose from 2011 to 2022 by 37.9%, while the Maynooth electoral division itself experienced major growth of 37.5% since 2011 to 2022. This trend of rapid growth in Maynooth and the surrounding area brings with it a proportional increase in demand for housing and associated services provision in the area to accommodate present and future population growth in the area. The proposed development at Railpark would help alleviate such demand while also providing much needed community infrastructure in the form of GP offices, a childcare facility, retail units and Local Parks. Assuming a figure of 2.98 persons per household (average for the Maynooth ED in 2022), which is above the current national average, the proposed development could result in a population of c. 1,755 persons when fully developed for the entire Railpark LRD development (589 no. units).

Table 3.1: Population at State, Regional, County and Local Level, 2011- 2022

Area	2011	2016	2022	Change 11 - 22	% change
State	4,588,252	4,757,976	5,149,139	560,887	**12.2%**
Greater Dublin Area	1,804,156	1,904,806	2,082,605	278,449	**15.4%**
Kildare County	210,312	222,504	247,774	37,462	**17.8%**
Maynooth Town	12,510	14,586	17,259	4,749	**37.9%**
Maynooth ED	13,617	15,905	18,729	5,112	**37.5%**

Source: CSO

Maynooth electoral division saw a marked population increase during the 2011-2016 intercensal period, and the 2016-2022 intercensal period following the wider trend in County Dublin and Kildare County. The provision of additional housing and supporting infrastructure and services, as proposed in this application, will help to support the growing demand for housing and existing services in the area.

3.3.4 Land Use & Settlement Patterns

The site is to the east of established residential neighbourhoods at Parklands and Rockfield. The site is located to the northeast of the residential development 'The Grange' permitted under Reg. Ref.: 21155 / ABP Ref: 312671-22 (Phase 1) and Reg. Ref.: 21156 / ABP Ref: 312685-22 (Phase 2), which is currently under construction. Maynooth Educate Together National School on Celbridge Road is located approx. 230 metres to the south and Gaelscoil Uí Fhiaich is located approximately 250 metres to the south across Celbridge Road. The wider Maynooth area is characterised by medium density residential developments.

In summary, the development comprises a Large-scale Residential Development of 589 no. residential units, comprising 369 no. houses and 220 no. apartments / duplex units. The proposals also include a five to part six storey Neighbourhood Centre – childcare facility (762 sq.m), health centre (174 sq.m), and two no. Class 1- Shop units (124 sq.m) and (166 sq.m).The development provides public and communal open spaces, landscaping, car and cycle parking spaces, internal roads, pedestrian and cycle paths, associated vehicular accesses, ESB substations, and all associated site and infrastructural works.

The subject site is located within the administrative area of Kildare County Council and is therefore subject to the objectives and policies contained within the Kildare County Development Plan 2023-2029. The site is also located within the Maynooth and Environs Joint Local Area Plan 2025-2031 area. The majority of the subject lands are zoned *"C2-New Residential"* in the Maynooth LAP, the objective of which is "*To provide for new residential development*". A small portion of the lands are zoned "N-Neighbourhood Centre" which seeks "*To provide for new/existing neighbourhood centres and associated facilities. Neighbourhood centres are intended to serve the immediate needs of local residents and workers and should not compete with similar retail uses within the town centre."*

The proposed residential units and public open space are located solely on lands zoned 'C2: New Residential' in accordance with the Maynooth and Environs Joint Local Area Plan Land Use Zoning Objectives Map. The proposed uses (residential and open space) are permitted in principle under this zoning objective.

The proposed neighbourhood centre includes a Childcare Facility, Health Centre, and 2 no. Class 1-Shop units, in addition to apartments, and is located within the lands zoned 'N: Neighbourhood Centre'. As part of the FI response a service building including a café kiosk has been proposed in POS 1, which is a permissible use under the "*C2-New Residential"* zoning.

Table 11.9 of the LAP confirms that these land uses are permitted in principle within the NC zoning objective. With the residential aspect open for consideration if it is ancillary to a neighbourhood centre. The proposed development provides for two no. vehicular accesses from the permitted Maynooth Eastern Ring Road (MERR), including a new pedestrian/cyclist signalised crossing, associated internal roads, pedestrian and cycle infrastructure, set down areas, bin and bike stores, paths and access points provided up to the application site boundary to provide for potential future connections to adjoining lands to the north and south, subject to agreement with the Planning Authority / adjacent landowner.

As outlined in ROD's Transport Impact Assessment, the proposed development is approximately 400m north of regional road R405 (Celbridge Road), approximately 400m south of the main Dublin to Sligo Railway line and the Royal Canal and approximately 600m south of regional Road R148 (Leixlip Road). Junction 7 on the M4 motorway is located approximately 950m south-west of the proposed development.

A Part 8 application (Reg. Ref.: P82019-08) was approved by Kildare County Council on the 29th of July 2019 for the Maynooth Eastern Ring Road (MERR), which will provide a link between the R405 Celbridge Road and R148 Leixlip Road, including a bridge over the Royal Canal and railway line. The route of this link road is orientated through the subject lands, and we note that the LAP requires the MERR to be constructed prior to or in tandem with the development of the new residential development within the Railpark KDA.

The CPO process associated with MERR is currently being progressed by KCC following approval by An Bord Pleanála on the 26th day of January 2024, a contractor was appointed in June 2025. Construction has since started on the MERR with the anticipated construction duration being 18 months, with completion expected by February 2027. In advance of the MERR being delivered, direct access to a public road is not available. However, recent permissions on the Railpark lands to the south, which are currently under construction, provide the potential for interim vehicular access through these adjacent lands to the Celbridge Road (R405).

The Maynooth Eastern Ring Road (to be provided by Kildare County Council) will traverse the proposed development lands in a north-south direction. Vehicular access to the proposed development will be via the new T-junction on the Maynooth Eastern Ring Road (MERR). The north-east section of the development will be accessed via a new local access road connecting the MERR. The MERR will connect the proposed development to the R148 Leixlip Road to the north and the R405 Celbridge Road to the south. The development of the Railpark KDA is contingent upon the delivery of the MERR in its entirety. In line with the adopted LAP, the applicant accepts a condition that the MERR shall be open and operational prior to the occupation of residential units, unless otherwise agreed in writing with Kildare County Council

The subject lands are strategically located adjacent to and accessed from the MERR, which in turn forms a strategic element of the overall Maynooth Outer Orbital Route, which is of strategic importance to the future and significant planned growth for the 'Key Town' of Maynooth.

As outlined in ROD Transport Impact Assessment, the Maynooth Train Station is within 12-20 minutes of walking distance from the proposed development and local amenities in Maynooth centre. It is served by the Commuter Service and Intercity Service. The Commuter Service runs between Dublin Connolly Station and Maynooth with a frequency of 15-30 minutes.

The proposed site is also accessible by bus. Bus service along Straffan Road is approximately c. 10 minutes walk from the proposed site. Phase 2 of the BusConnects Network Redesign launched on November 2021 saw the introduction of C-Spine routes including the following below that serve the Maynooth area:

- C3 – Maynooth to Ringsend: Frequency 30 minutes.
- C4 - Maynooth to Ringsend: Frequency 30 minutes.
- C5 - Maynooth to Ringsend: Frequency 5 buses per day.
- C6 - Maynooth to Ringsend; Frequency 5 buses per day.

As part of the BusConnects programme, it is proposed to further enhance the number of bus service in the area. The following BusConnects routes will serve Straffan Road and the R405:

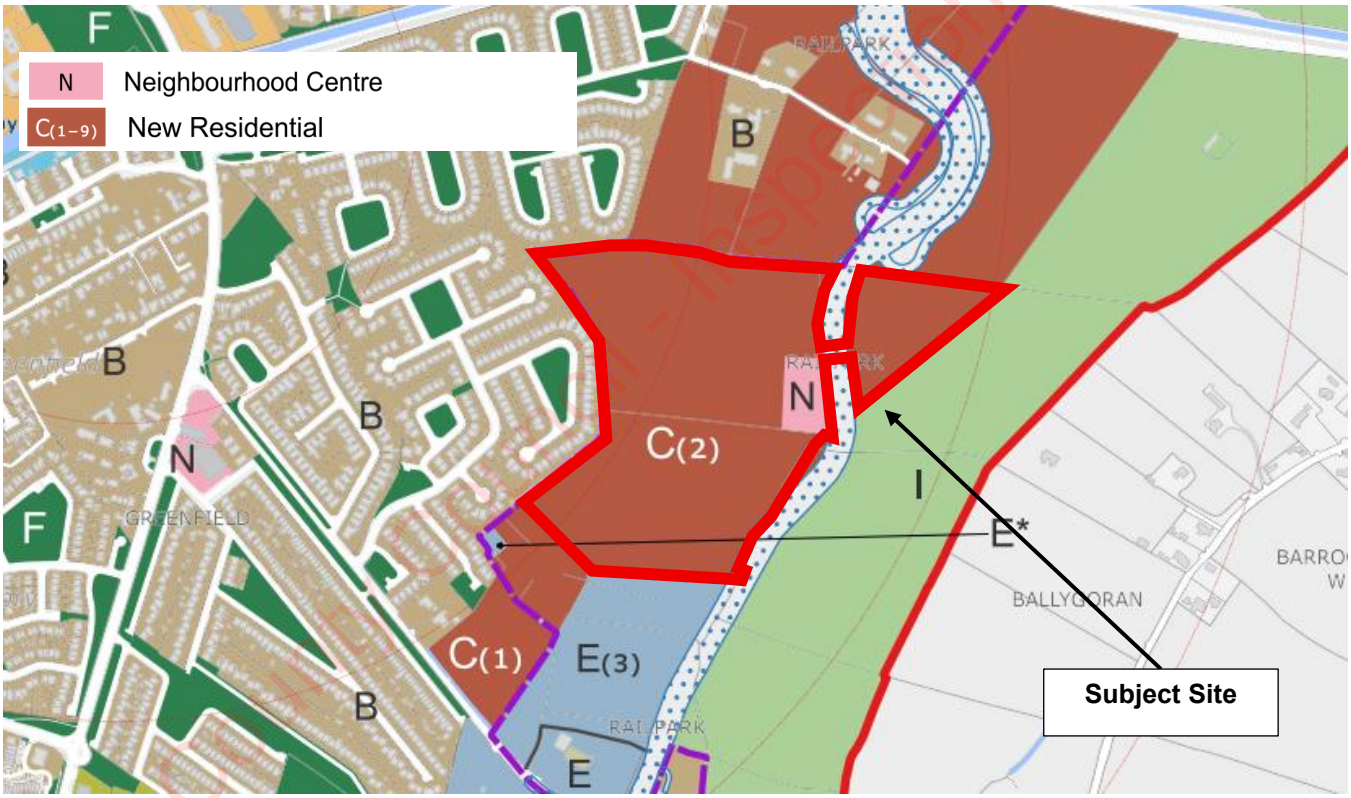
- D3: Maynooth – Ringsend, serving Straffan Road

- X25: Maynooth – Merrion Square, serving Straffan Road
- X26: Maynooth – UCD (Via City Centre), serving Straffan Road
- W6: Maynooth – Tallaght, serving R405

The subject site is well served by existing social and community infrastructure with a wide mix and variety of uses. The proposed neighbourhood centre will provide for a childcare facility at ground floor level of Block B, a health centre and a mix of retail uses. The subject site is also within walking distance of the town centre with a large range of restaurants, cafes and other services/facilities such as churches, community centres, medical services and a library. There are a number of sports and recreational facilities available in proximity to the site, including Ace Fit Club, Harbour Field Park and Glenroyal Leisure Club.

The lands to the south of the application site and to the east of the 'Grange' residential development are currently undeveloped and reserved for the Department of Education in relation to the provision of 1 no. post primary school equate to 4.38 ha in total.

Figure 3.6: Extract from Map 11.1 Land Use Zoning, Maynooth and Environs Joint Local Area Plan 2025-2031 (approximate site location outlined in red)



Source: Map 11.1 Land Use Zoning, Maynooth and Environs Joint Local Area Plan 2025-2031

3.3.5 Housing

The '*Delivering Homes, Building Communities'* plan by the Irish Government and Department of Housing, Local Government and Heritage states that "*Despite significant recent progress, there remains an unmet housing need in Ireland. Even with the additional 137,000 new homes added to housing stock since the beginning of 2021, housing remains one of the biggest social and economic challenges the country faces.*".

Over the last number of years, the steadily growing demand for housing, combined with a critical undersupply of quality residential provision, has led to significant challenges in terms of affordability, homelessness, and vacancy, particularly within the Greater Dublin Area and key commuter towns such as Maynooth, Celbridge, and Leixlip. There is a clear and established housing need in County Kildare, across the Greater Dublin Area, and nationally, as recognised in successive Government housing and planning policies, including Rebuilding Ireland: Action Plan for Housing and Homelessness (2016), Housing for All, A New Housing Plan for Ireland (2021) and Delivering Homes, Building Communities 2025-2030: An Action Plan on Housing Supply and Targeting Homelessness (2025) which set a national target to deliver 300,000 new homes by 2030.

The Government's long-term vision for the housing system is to ensure a sustainable, affordable and high-quality supply of housing in the right locations, with social, economic and environmental sustainability at its core. The proposed development will contribute meaningfully to addressing this strategic housing need, by delivering a high-quality new residential community on zoned lands in Maynooth, adjacent to existing settlements, public transport links and local amenities, and supported by an appropriate range of community, childcare, retail and open space infrastructure.

The National Planning Framework (NPF), published in 2018, replaced the National Spatial Strategy as the overall spatial planning and development strategy for Ireland. Planning legislation provides for the Government to revise or replace the NPF every six years. On the 30th of April 2025, the Houses of the Oireachtas approved the First Revision of the National Planning Framework (NPF). The revised NPF (2025) introduced a new population growth target increasing from 5.8 million to 6.1 million by 2040. The 2025 revision of the NPF outlines a national target of 50,000 additional homes per annum to 2040, or 800,000 additional homes between 2024 and 2040 (compared to 550,000 additional homes between 2018 and 2040).

On the 29th of July 2025, the Department of Housing, Local Government and Heritage published the NPF Implementation: Housing Growth Requirements, as guidelines in accordance with Section 28 of the Planning and Development Act 2000 (as amended). These guidelines replaced the 'Section 28: Housing Supply Target Methodology for Development Planning (2020)'.

These guidelines estimate a total housing demand of c. 55,000 dwellings per annum to 2034 (including unmet demand of 13,900) and an estimated total housing demand of c. 41,000 dwellings per annum between 2034 and 2040 will need to be provided for in development plans. The new housing targets aim to evenly distribute new homes between the Eastern & Midland Region and the rest of the country, promoting balanced regional growth.

Moreover, the current level of housing need and demand is not at equilibrium, being significantly augmented by the extremely low level of housing completions in the decade since 2010 (See figure below). Over this period, a significant shortfall in housing has amassed year on year, which is reflected in the data collected in Census 2016 and 2022, which revealed overcrowding and increasing numbers of households living in cramped conditions. The guidelines outline that Unmet demand from 2017-2040 is estimated at 140,000 dwellings.

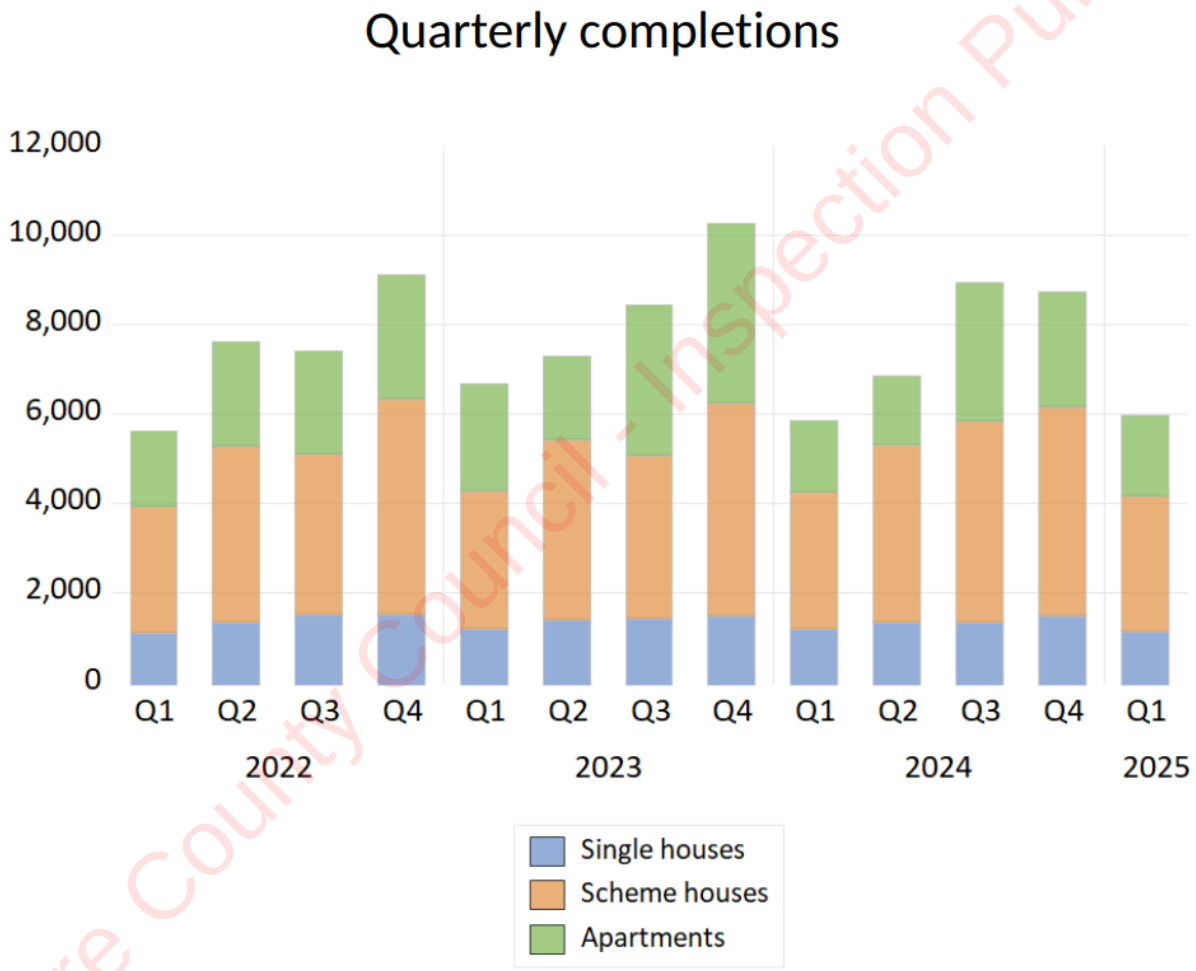
The ESRI Summer Commentary 2025 notes that *"The number of housing completions in 2024, at just over 30,000, was disappointing and we remain somewhat pessimistic about the scope for substantial growth in 2025 and 2026. We have reduced our forecast from our previous Commentary for the present*

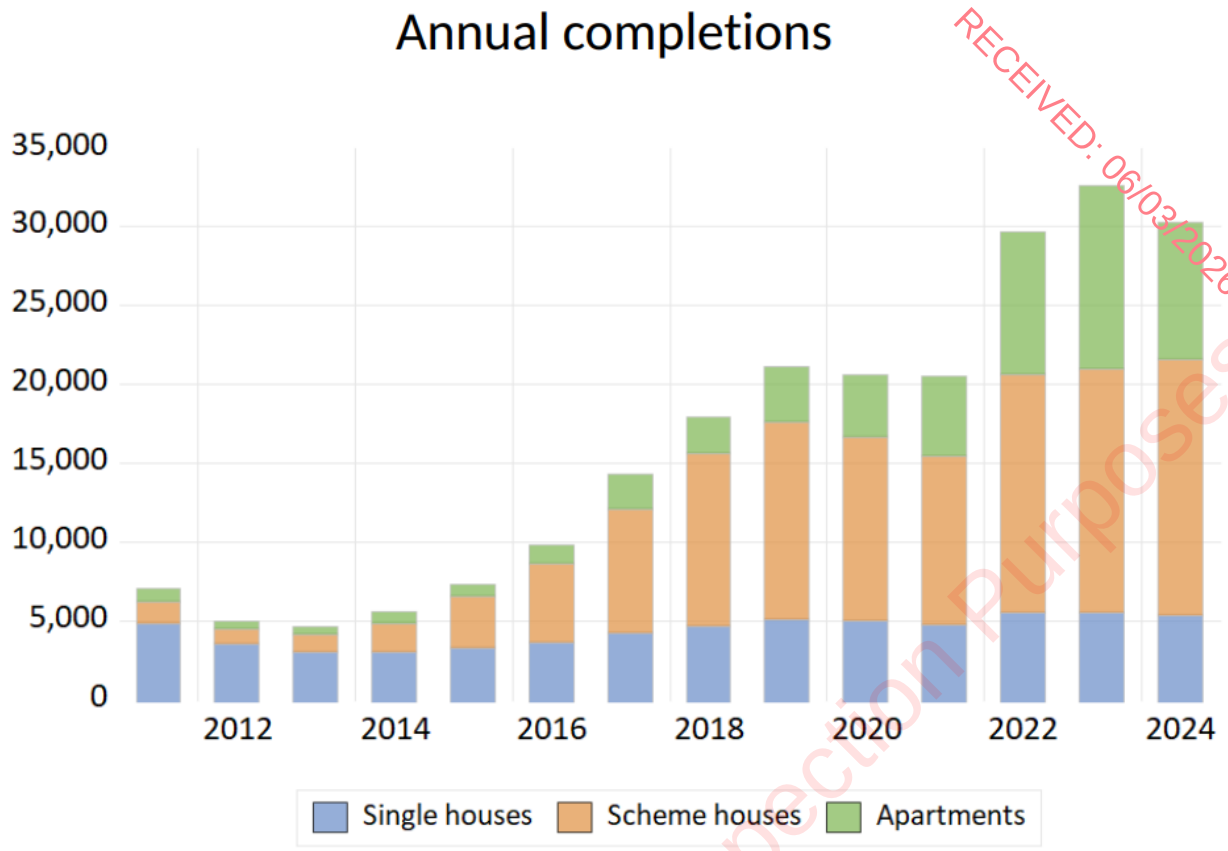
year, and now expect 33,000 completions in 2025 and just under 37,000 completions in 2026, but there are considerable downside risks."

Census 2022 revealed an increase in the national housing stock of just 108,476 units during the six-year intercensal period (taking into account obsolescence during that period) representing an increase of just over 5% (as shown in the figure below).

This is notable given the increase in population seen concurrently (391,163 or 8.22%). Furthermore, c. 31% of these additional units were one off houses, the majority of which would never have come to market. However, incongruously, Census 2022 also revealed a slight decrease in the national average household size (from 2.75 to 2.74) (CSO, 2023). Nevertheless, this is still considered high and is attributed to household formation falling behind population growth, another indicator of lacking housing availability and increasing housing need, in recent times.

Figure 3.7: Quarterly and Yearly housing completions commencements for the State

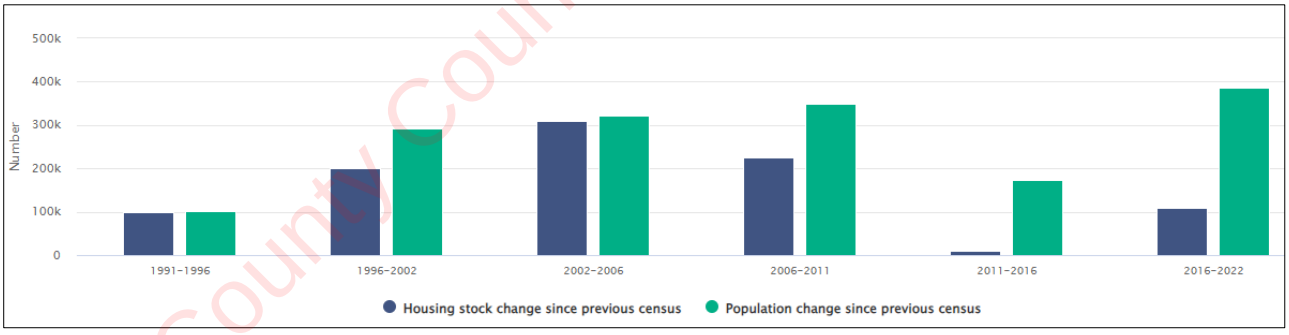




Source: ESRI - Quarterly Economic Commentary - Summer 2025 (CSO)

In terms of increasing future housing delivery, the proposed development is located at a location which is zoned for significant residential development, and which is appropriate for the uses proposed.

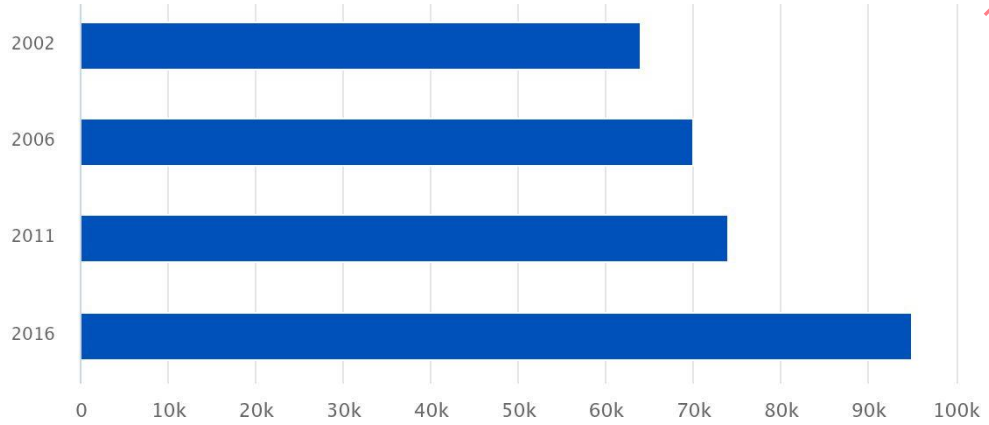
Figure 3.8: Changes in population and housing stock for Ireland, 1991-2022



Source: Central Statistics Office, 2023

The 2016-2022 intercensal period also saw a notable increase in the number of households with more persons than rooms in their dwelling (see figure below). In Census 2022, there were 58,869 occupied dwellings with an average of more than one person per room and 9,271 households with an average of more than two persons per room.

Figure 3.9: Number of households with more persons than rooms



Source: Central Statistics Office, 2017

Close to 10% of the population resided within these households in 2016 at an average of 4.7 persons per household. This is an indicator of increased overcrowding (and housing need) which may be attributed to lack of housing availability and rising costs.

These figures set out above all point to a significant and increasing housing need in the state which is not being met at present.

The Central Bank of Ireland has published a study entitled 'Economic policy issues in the Irish housing market'[1], which includes the following key points:

- *Updated estimates by Central Bank staff based on new population projections by the CSO – and taking into account the accumulated pent up demand – indicate that around 52,000 new homes could be needed per year out to the middle of the century, or a 20,000 unit increase relative to 2023 supply. Of course these estimates rely on assumptions and are subject to uncertainty, as was evident for example in the faster than expected population growth since the last set of population projections in 2018."*
- *"Following the Global Financial Crisis, the Irish housing market has been subject to more than a decade of under-supply. Over this period, house price and rental growth have outstripped income growth, stretching affordability. While these challenges have a global dimension, housing output as a share of national income here has been significantly below the euro area average for a prolonged period."*

The detail above demonstrates that there has been a continued shortfall in the delivery of housing over an extended period. The proposed development as revised at FI stage will provide 589 no. dwellings in a mix of 369 no. houses and 220 no. apartments / duplex units. Assuming a figure of 2.98 persons per household (average for the Maynooth ED in 2022), the proposed development could result in a population of c. 1,755 persons when fully developed.

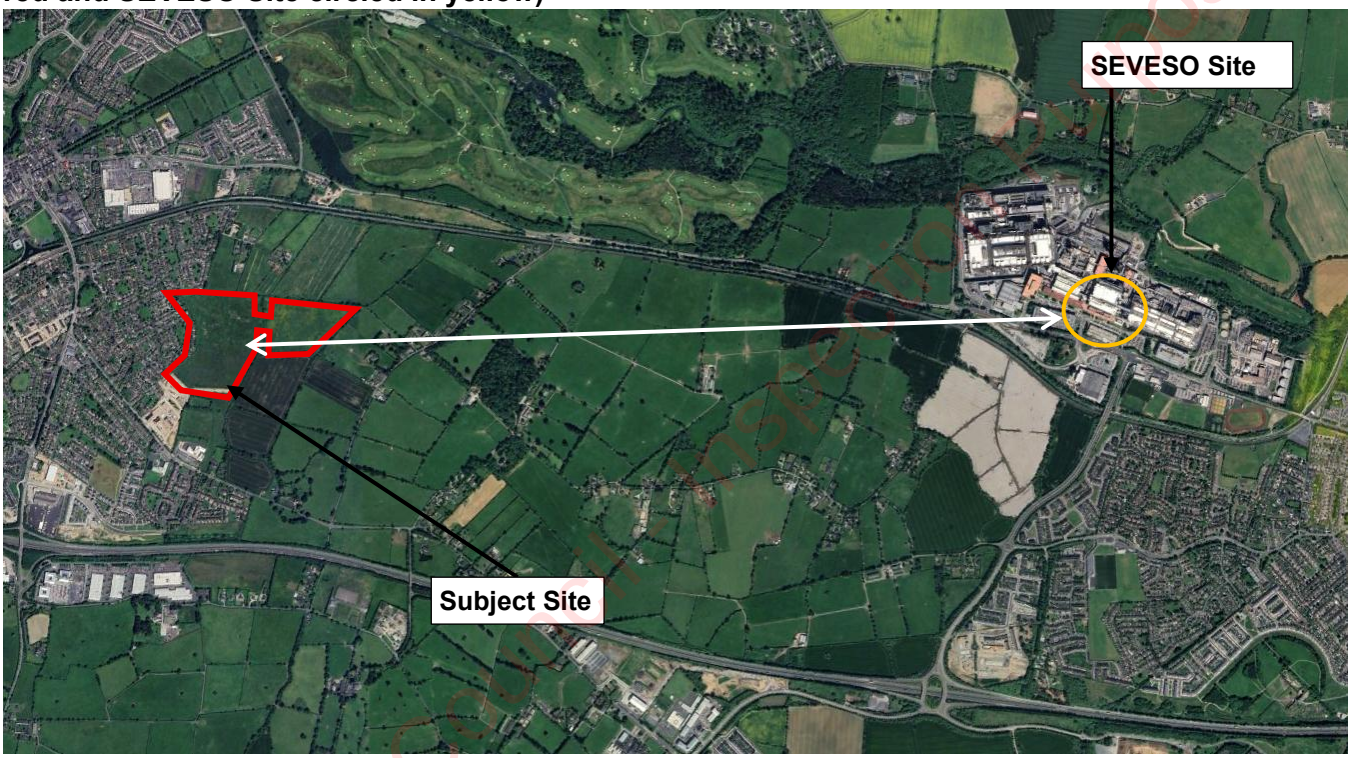
[1] Available at: https://www.centralbank.ie/docs/default-source/publications/quarterly-bulletins/quarterly-bulletin-signed-articles/economic-policy-issues-in-the-irish-housing-market.pdf

3.3.6 Health & Safety

The closest SEVESO Site (Intel Ireland Limited, Collinstown Industrial Park, Leixlip, Co. Kildare) is located c. 3.7km east of the application site. The site of the proposed development is not in the consultation zone of this SEVESO Site (which has a 1000 meter consultation zone).

The surrounding context consists of a mix of residential, town centre, community and educational, light industry and warehousing, agriculture, neighbourhood centre, and open space. It does not include SEVESO II Directive sites (96/82/EC & 2003/105/EC) which might result in a risk to human health and safety. It is not within the catchment area of a SEVESO Site.

Figure 3.10: Location of the Subject Site and the SEVESO Site (approximate location marked in red and SEVESO Site circled in yellow)



Source: Google Earth

3.3.7 Risk of Major Accidents and Disasters

In accordance with the EIA Directive and having regard to climate adaptation policy, the assessment of major accidents and disasters includes consideration of climate-related hazards that may affect population health and community resilience over time, including extreme rainfall events, storm events, heatwaves, infrastructure disruption and cumulative climate pressures.

The EIA Directive states that an EIAR must include the expected effects arising from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project.

In this respect, taking cognisance of the other chapters contained within this EIAR document, which should be reviewed for further details, it is not considered that the proposed development site presents risks of major accidents or disasters, either caused by the scheme itself or from external manmade or natural disasters.

3.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

As noted above, the scheme has been revised in response to the FI request. The revisions to the proposed scheme, summarised below, respond directly to the FI request issued by Kildare County Council, and do not result in the potential for any significant additional environmental impacts when compared with the original application. The proposed development has been revised in response to the FI Request, with improvements to layout, architectural quality, density distribution and public realm design, and the changes can be summarised as follows:

- A range of new three-storey house types (Types L, La, Q, Qa, S1 and S2) has been introduced to deliver a stronger urban edge to the park and improve enclosure and passive surveillance.
- New own-door Type 4H maisonette units have been incorporated, enhancing housing mix while contributing to increased density in a low-rise form.
- The Duplex Type A townhouse typology has been reconfigured, with improved layouts, increased separation distances between duplex blocks, enhanced elevation fenestration and removal of balcony railings.
- The alterations above have resulted in an increase of 8 no. units to provide a total of 589 no. residential units, comprising 369 no. houses and 220 no. apartments / duplex units.
- The residential mix has been updated to increase density in appropriate locations, particularly around the main public open space (cells 3, 4, 5, 6 and 7), achieving an overall density of c. 39.45 units per hectare.
- Block A within the Neighbourhood Centre has been reoriented by 90 degrees to align with Block B, improving urban structure, legibility and frontage to streets and public spaces.
- The previously proposed standalone café kiosk has been omitted, with café and community uses rationalised within a new site services building within the Local Park.
- Reconfiguration of the commercial uses within Block A of the neighbourhood centre and provision of a 136 sq.m community space.
- The architectural approach to gateway buildings has been simplified, with the removal of tower projections and the introduction of higher-quality finishes.
- Public open spaces have been comprehensively reconfigured and upgraded, providing clearer definition, improved usability, enhanced active and passive recreational provision, and stronger integration with surrounding development.
- The Local Park (POS 1) has been formalised and enhanced, with increased activity and overlooking from surrounding development, upgraded play and sports facilities (including MUGAs, calisthenics and skate facilities), improved entrances and boundaries, and the introduction of a new c. 90 sq.m public maintenance and amenity building to support long-term park management.
- The linear public open space / linear park has been reconfigured and enhanced, with increased width and clearer definition, stronger landscape structure and planting, improved integration with adjacent development, reconfigured SuDS features to improve usability and visual quality, and strengthened connectivity between neighbourhoods and the main park.
- A revised SuDS and biodiversity-led landscape strategy has been implemented across all public open spaces, integrating wetlands, swales, detention areas and microhabitats in a manner that enhances amenity, biodiversity and long-term functionality.
- The access and junction strategy has been refined to confirm that all traffic signals, junction works and associated infrastructure serving the development are fully contained within the applicant's red line boundary, with direct tie-in to the approved MERR scheme without requiring any modification.

3.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

3.5.1 Introduction

This section provides a description of the specific, direct and indirect, impacts that the proposed development may have during both the construction and operational phases of the proposed development. As stated, guidance documents from the EPA, the European Commission, and the Department of Housing, Planning and Local Government outline that the assessment of impacts on population and human health should focus on the health issues and environmental hazards arising from the proposed development. A wider consideration of human health effects which do not relate to the factors identified in the EIA Directive is not required. Additionally, this section addresses the population and socioeconomic impacts of the proposed development.

For a more detailed assessment of potential impacts associated with other environmental factors, please refer to specific chapters of the EIAR which assess the environmental topics outlined in the EIA Directive. The Outline Construction and Environmental Management Plan, the Outline Construction Waste Management Plan and the Operational Waste Management Plan, which are included as standalone reports with this application, also provide a more detailed assessment of the construction, waste and indicative phasing proposals for this development.

3.5.2 Water

Construction Phase

Construction of the proposed development will require the removal of a large part of the topsoil to facilitate the construction of the housing units, infrastructure service provision, road construction, surface water storage systems etc. Given the extent of disturbance, there is potential for weathering and erosion of the surface soils from precipitation and run-off. The excavation of soil and subsoil layers and new surface water drainage network including overland attenuation storage features to accommodate surface water runoff from the development might have a potential slight, negative, permanent and residual impact on groundwater.

During the course of the construction phase of the proposed development, there is potential, in the absence of mitigation, for surface water runoff to suffer from increased levels of silt or other pollutants, in addition to potential pollution from leaks or spillages from construction activities. These impacts are temporary, as well as for the potential impact of heavy rain fall in open trenches and the discharge of wash water from concrete trucks and discharge of vehicle wheel wash water which have the potential to contaminate the groundwater. The Outline Construction and Environmental Management Plan, and the Construction Waste Management Plan set out how all materials will be managed, stored and disposed of in an appropriate manner, mitigating the potential negative effects as outlined.

Potential impact on water is addressed in Chapter 9 (Water) which has been prepared by ROD Consulting, and a number of mitigation measures are outlined in that chapter of this Environmental Impact Assessment Report. These mitigation measures will serve to minimise potential adverse impacts of the construction phase to the water environment thereby minimising any associated risk to human health from water contamination. Therefore, the impact of construction of the proposed development in relation to water is likely to be imperceptible with respect to human health.

Operational Phase

SUDs will be implemented in accordance with the recommendations of the GDSDS and Kildare County Council requirements. In addition, the requirements of *'The Planning System and Flood Risk Management Guidelines for Planning Authorities'* will be adhered to.

In the absence of SUDs measures, surface water run-off discharge rates and flooding downstream from the development sites may be increased because of increase in impermeable surfaces, however with the implementation of SUDS as part of a treatment train approach, there are no predicted impacts on the water and hydrogeological environment arising from the operational phase.

Residual impacts from earthworks haulage and the risk of contamination of groundwater are deemed to be of minor risk. The residual impacts for a residential development, and open space are deemed to be imperceptible post construction (during the operational phase).

Further details on the mitigation measures are set out in Chapter 9 (water) of this EIAR. Therefore, the potential impact on population and human health in this regard is considered to be insignificant.

3.5.3 Noise and Vibration

Construction Phase

Noise and Vibration are addressed in Chapter 12 (Noise and Vibration) which has been prepared by Wave Dynamics Limited Acoustic Consultants.

During the construction phase there will be extensive site works, involving construction machinery, construction activities on site, and construction traffic, which will all generate noise. The highest noise levels will be generated during the substructure and superstructure stages of the construction phase. The closest noise sensitive locations to the main building works will be the residential units to the west of the site which are at a distance of approximately 290m from the centre of the site. The remainder of works will take place across the site at varying distances of up to 600m.

Chapter 12 of this EIAR states:

"Mitigation measures are required during the substructure and superstructure stages of the construction phase to minimise potential noise and vibration impacts. This includes managing noise levels associate with the construction activities. With the implementation of these measures, the construction phase impacts are expected to be managed effectively and kept within acceptable thresholds."

The potential vibration impact during the construction phase is of imperceptible impact.

Operational Phase

The main potential for altering the noise environment once the development is operational, and thus impacting neighbouring residential receptors, is plant, traffic movements and car parking, external/public amenity spaces and creche play areas.

Traffic flow data in terms of the AADT traffic flow figures has been assessed for the opening year and the opening year +15. The calculated change in noise levels during these two periods are summarised in Table 12.23 of Chapter 12. Chapter 12 predicts that the impact in this regard a minor magnitude of impact.

In relation to the operational noise impact at operational stage, Chapter 12 states:

"The operational phase of the development is not predicted to have a negative impact considering the predicted impacts are in line with the project criteria Noise associated with the increase in traffic flows is projected to result in a maximum increase of 1dB(A) from baseline figures in 2024 to the "Do Something 2043" scenario, which is considered negligible in terms of perceptible change. Additionally, noise from external plant and equipment has been assessed to meet the required standards, ensuring that operational impacts remain minor and localised. Overall, the operational phase will have minimal residual effects on the surrounding environment during both the daytime and night-time periods."

There are no expected sources of vibration associated with the operational phase.

3.5.4 Air Quality

Construction Phase

During the construction phase, site clearance and ground excavation works have the potential to generate dust emissions rising from the operation and movement of machinery on site. This could have a potential impact on population and human health.

Chapter 10 of this EIAR states:

"There is at most a high risk in terms of dust soiling and there is at most a low risk of human health impacts associated with the proposed works. Best practice dust mitigation measures appropriate for high-risk sites will be implemented to ensure there are no significant impacts at nearby sensitive receptors. In the absence of mitigation, dust impacts are predicted to be direct, short-term, negative and slight, which is overall not significant in EIA terms."

Chapter 10 goes on to state the following:

"There is also the potential for traffic emissions to affect air quality in the short-term over the construction phase, particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed, and a detailed air quality assessment has been scoped out as none of the road links affected by the Proposed Development satisfy the TII scoping assessment criteria in Section 10.2.2.2. It can be determined that the construction stage traffic will have a direct, short-term, negative and imperceptible impact on air quality, which is overall not significant in EIA terms."

Operational Phase

In relation to Population and Human Health, Chapter 10 of the EIAR states:

"Interactions between air quality and population and human health have been considered as the proposed development has the potential to cause health issues as a result of impacts on air quality from dust nuisances and potential traffic derived pollutants. However, the mitigation measures employed at

the Proposed Development will ensure that all impacts are compliant with ambient air quality standards and human health will not be affected. Furthermore, traffic-related pollutants have been assessed and determined as having an overall insignificant impact, therefore air quality impacts from the proposed development are not expected to have a significant impact on population and human health."

Chapter 10 further states that *"In accordance with the EPA Guidelines (EPA, 2022) the ecological impacts associated with the operational phase traffic emissions are overall direct, long-term, negative and slight."*

3.5.5 Landscape and Visual Impact

Construction Phase

As described in greater detail in Chapter 6- Landscape and Visual Impact Assessment, the construction phase will impact the landscape of the site and immediate environs.

In relation to Landscape Impact, Chapter 6 of the EIAR states:

"There is the potential for likely significant and adverse temporary effects on the landscape during the construction stage of the project resulting from the following elements associated with construction works:

- *Erection of physical structures such as site compounds and storage area*
- *Erection of site hoarding, signage, security fencing*
- *Presence of site machinery and delivery/storage of materials etc*
- *Lighting:*
  - *Temporary security lighting*
  - *Lighting at height associated with construction of structures*
  - *Lighting in the contractor's compound and car parking areas*
  - *Light spill and glare towards surrounding residential and agricultural receptor areas to the north, west and south of the site*
  - *Light spill which could impact ecology/biodiversity"*

In relation to Visual Impact, Chapter 6 of the EIAR states:

"The visual effects due to construction are likely to be short term, terminating upon completion of the development. There is potential for likely significant and adverse short-term effects during construction from the following elements associated with construction and works:

- *Dust*
- *Site huts*
- *Building materials*
- *Ground disturbance (e.g. topsoil, stockpiles, etc.)*
- *Site hoarding/security fencing*
- *Construction works*

There is potential for likely significant and adverse short-term visual effects from the use of temporary buildings, machinery necessary for construction works at proposed works, as well as stockpiling of materials.

There is potential for a significant and adverse short-term effects from the transportation of the material to be recycled and the recycled material to and from the site if applicable. There is the potential for a likely significant and adverse short-term visual impact on views into the site.

The main stages of the construction phasing will include the following:

- *Site preparation works*
- *Site establishment and erection of temporary structures*
- *Diversion and connection of services and utilities*
- *Construction of foundations and structures*
- *Mechanical and electrical installation*
- *Fit-out and external works."*

Potential construction stage impacts, following mitigation, are predicted to vary from slight and neutral to moderate and negative, depending on the stage of construction, and the intensity of site activity. The construction impacts will be of short-term duration.

Operational Phase

Please refer to Chapter 6 of the EIAR 'Landscape and Visual Impacts' and the verified view photomontages for the detailed assessment. The proposed development will provide new housing, buildings, and public spaces, together with improved permeability and connections.

The assessment finds that the majority of operational phase effects will be neutral to none. Where effects do occur, these are generally slight to moderate in effect and neutral in quality, reflecting localised changes in character from agricultural use to residential development. One cumulative effect along the Celbridge Road is assessed as neutral, significant, while a further cumulative effect from the Royal Canal in combination with the MERR is assessed as negative, profound.

The adverse effects identified arise mainly from the replacement of the agricultural landscape with built form. However, these are not considered significant in the context of the site's low sensitivity, its limited existing value, and its setting within an established and expanding residential area. The cumulative effect with the MERR reflects the impact of strategic infrastructure delivery rather than the proposed development in isolation.

Mitigation will be achieved through extensive landscape proposals, retention of boundary vegetation, provision of SuDS features and the creation of high-quality public open spaces. These measures will soften visual change, enhance biodiversity and provide amenity benefits.

Taking these factors into account, significant standalone adverse visual effects are unlikely. The proposed development will result in predominantly neutral long-term effects, with slight to moderate effects and one significant cumulative effect were combined with the permitted MERR.

Chapter 6 of the EIAR states:
"It is considered unlikely that there will be significant adverse visual effects from the proposed development once it is operational and all landscape installations and proposals as presented in the landscape site plan are implemented in full."

The Landscape and Visual Impact Assessment (LVIA) chapter has not been updated in full; however, updated photomontages and supporting visual material have been provided to illustrate the revised proposals and enable assessment of any potential visual effects arising from the amendments. A review of the design amendments has been undertaken by the project LVIA consultant, having regard to the assessment parameters established within Chapter 6 – Landscape and Visual Impact Assessment (LVIA) of the EIAR. This review confirms that the proposed revisions do not result in any material change to the development as previously assessed, including in respect of building height, massing, extent of development, landscape strategy, or the predicted nature and magnitude of landscape and visual effects. As the amendments do not alter the visual envelope of the development or the significance of landscape and visual effects identified within the EIAR, the conclusions of the submitted LVIA remain valid and unchanged. On this basis, the submission of an updated LVIA chapter is not considered necessary as part of this Further Information response. Updated photomontages are provided for clarification and verification purposes only and do not give rise to any change in the assessment findings previously reported.

3.5.6 Climate

Construction Phase

Climate change is recognised at national and local policy level as an increasing determinant of population health, with potential implications arising through environmental exposure pathways. In this context, the construction phase of the proposed development has been assessed having regard to the National Adaptation Framework 2024, the Kildare County Council Climate Action Plan 2024-2029, and the Healthy Ireland Framework 2019-2025.

During the construction phase, potential impacts on Population and Human Health related to climate change may arise indirectly through temporary environmental effects, such as dust generation, noise, traffic disruption and the mobilisation of surface contaminants, which may be exacerbated during periods of adverse weather, including heavy rainfall or elevated temperatures. These impacts are short term and temporary in nature and are addressed through standard construction management and mitigation measures outlined in Chapter 11 of this EIAR, including the Outline Construction and Environmental Management Plan and the Outline Construction Waste Management Plan.

Having regard to the temporary nature of construction activities, the application of appropriate mitigation measures, and the assessments set out elsewhere in this EIAR, no likely significant adverse impacts on Population and Human Health arising from climate change are anticipated during the construction phase.

Operational Phase

These climate-related hazards have potential implications for population health, including increased risk of heat stress, reduced environmental comfort, mental health effects associated with extreme weather events, and impacts on vulnerable population groups. The proposed development incorporates adaptation and resilience measures that seek to minimise such risks and support long-term health outcomes for residents.

The operational phase of the proposed development has been assessed in terms of the potential effects of climate change on Population and Human Health, including consideration of climate-related hazards

that may influence environmental conditions and community resilience over time. These include, inter alia, increased rainfall intensity, storm events, and periods of elevated temperatures.

The resilience of the proposed development to such hazards has been considered through its design, layout and infrastructure provision, including surface water management measures, compliance with relevant building standards, and the incorporation of mitigation and adaptation measures assessed in detail within Chapter 11- Climate and the Flood Risk Assessment. In addition, the layout of the development, provision of public and communal open space, pedestrian and cycle permeability, and proximity to public transport and services contribute positively to residential amenity and support physical activity and social interaction, which are recognised determinants of population health.

Having regard to the nature and location of the site, the mitigation and adaptation measures incorporated into the proposed development, and the assessments contained elsewhere in this EIAR, the proposed development is not considered likely to result in significant adverse impacts on Population and Human Health arising from climate change during the operational phase. Overall, the resulting impact is assessed as neutral to positive, long term and not significant.

3.5.7 Economic Activity

Construction Phase

The construction phase of the proposed development is likely to result in a positive net improvement in economic activity in the area of the proposed development site particularly in the construction sector and in associated secondary building services industries.

The construction of the development and all associated infrastructure will precipitate a positive impact on construction-related employment for the duration of the construction phase.

The construction phase will also have secondary and indirect 'spin-off' impacts on ancillary support services in the area of the site, such as retail services, together with wider benefits in the aggregate extraction (quarry) sector, building supply services, professional and technical professions etc. These beneficial impacts on economic activity will be largely temporary but will contribute to the overall future viability of the construction sector and related services and professions over the construction period.

The proposed development could have a slight negative economic impact on the surrounding area during the construction phase due to traffic and associated nuisance, dust, and noise. These issues and appropriate mitigation measures are addressed in Chapters 10, 12 and 13 of the EIAR, in the Traffic and Transport Assessment, the Outline Construction and Environmental Management Plan and the Outline Construction Waste Management Plan which accompany the application. A Construction Traffic Management Plan will be implemented for the site during the construction process which will minimise disruption to the surrounding road network.

Operational Phase

The operational phase of the proposed development will result in an additional element of residential development. The Large-scale Residential Development will provide accommodation for residents in the form of 589 no. high quality residential houses and duplexes / apartments located on a site which is appropriately situated and serviced for such development in planning terms, of a design and materiality

which ensure a high-quality design residential development. This increase in occupancy in the area will enhance local spending power and will assist with the delivery of a critical mass of population which will support a wide range of additional local businesses, services, transport infrastructure and employment opportunities, at a location that will continue to grow in population.

Economic opportunities will also be provided for within the development in the form of the Neighbourhood Centre, which includes a variety of employment opportunities in the form of childcare facility, health centre, and 2 no. class-1 shops in addition the proposed services building in POS1 as part of the FI submission will provide for a café kiosk.

The proposed development will help to meet established housing need and demand within Kildare, at a location which will encourage public transport and active transit modes due to its proximity to good quality public transport, and a broad range of existing and permitted uses, facilities and amenities.

The proposal includes 20% Part V provision on site in accordance with the requirements of the Act, which will provide for an enhanced mix of tenures, and add to the existing social housing stock. The overall benefit to the economic activity of the surrounding area resulting from the development can be considered moderate, long term, and positive.

3.5.8 Social Patterns

Construction Phase

The construction phase of the proposed development is unlikely to have any significant impact on social patterns within the surrounding area. Some temporary additional local populations may arise out of construction activity. However, these impacts are imperceptible, temporary in nature and therefore not considered significant.

It is acknowledged that the construction phase of the project may have some short-term negative impacts on local residents. Such impacts are likely to be associated with construction traffic and construction noise. These impacts are dealt with separately and assessed elsewhere in the EIAR, including Chapter 2 - Project Description and Alternatives Examined, Chapter 10 - Air Quality and Chapter 12 - Noise and Vibration. Traffic and transportation impacts are dealt with within Chapter 13.

Such impacts will be short term and in the longer term, the completed scheme will have beneficial impacts for local businesses, residents and the wider community. Any disturbance is predicted to be commensurate with the normal disturbance associated with the construction industry where a site is efficiently, sensitively and properly managed having regard to neighbouring activities. The construction methods employed, and the hours of work proposed will be designed to minimise potential impacts to nearby residents. An Outline Construction and Environmental Management Plan and an Outline Construction Waste Management Plan have been prepared and are submitted with this planning application.

Operational Phase

The proposed development reflects the principles of healthy placemaking by integrating housing, services, open space, active travel infrastructure and community facilities within a walkable neighbourhood structure. These elements support daily physical activity, social interaction, reduced car

dependency and improved mental wellbeing, consistent with the objectives of the Healthy Ireland Framework.

The addition of new residents and additional elements of employment (within the neighbourhood centre) to the area will improve the vibrancy and vitality of the area and will help to support existing community and social infrastructure, in addition to further supporting nearby services and businesses. As set out within the Social and Community Infrastructure Audit / Assessment submitted as a standalone report with the application, the provision of a childcare facility and health centre will help meet the needs of the proposed development and surrounding area, and there is a considerable range of existing community and social infrastructure proximate to the subject site, which the residents of the proposed development will be able to avail of.

The Social and Community Infrastructure Audit / Assessment also demonstrates that the extra demand created by the proposal for primary and post primary educational facilities will not be significant in relation to current levels of local provision, while increased levels of demand from the scheme is unlikely to result in significant impact on existing services. Notwithstanding this, the southeastern parcel of the wider KDA lands are reserved for a new education campus by the Department of Education and will accommodate modern education facilities for the Maynooth area. Having regard to the estimated level of demand and the surrounding school capacity within close proximity of the subject site, it is considered that the existing and planned primary and secondary education infrastructure can accommodate the predicted increase in demand arising from the proposed development and is therefore adequate.

Therefore, while demand for schools in the area is likely to increase based on permitted and future development in the area, the necessary school's infrastructure will be progressed by the Department to meet increase in demand.

The proposed development includes the provision of a childcare facility with a GFA of 762 sq.m. As set out within the Social and Community Infrastructure Audit / Assessment Report, this childcare facility will accommodate the likely demand arising from the proposed development based on the calculation methodology within the 2001 Childcare Facility Guidelines and will also provide an additional element of childcare capacity over and above the likely demand from the proposed development.

Once operational, the proposed development will give rise to much needed additional residential accommodation. Residents will spend a portion of their income locally which would not happen without the proposed development. The proposed development provides for a childcare facility and health centre which are fully integrated with the design of the scheme. The proposed development will provide long term job opportunities for people living in the area, including healthcare professionals in the proposed health centre, in addition to those construction and development jobs provided during the construction phase.

This planning application is accompanied by a Social and Community Infrastructure Audit / Assessment Report prepared by John Spain Associates, which confirms that the area within which the proposed development is situated has the necessary community and social infrastructure to support the proposal, as supplemented by the proposed community infrastructure and facilities included within the proposed development itself.

Having regard to the fact that the area within which the development is situated benefits from a good level of social and community infrastructure and noting the elements of the proposed development which

will improve and strengthen this infrastructure, it is concluded that the proposed development will precipitate a moderate, positive, long term impact on social patterns in the operational phase.

These outcomes are consistent with the objectives of the Healthy Ireland Framework in supporting environments that facilitate social interaction, access to services and opportunities for physical activity.

3.5.9 Land-Use & Settlement Patterns

Construction Phase

The development works will be largely confined to the proposed development site and have the potential to impact adversely and result in the temporary degradation of the local visual environment on a short-term basis. The visual impacts are assessed in greater detail in Chapter 6 of this EIAR.

The Maynooth Eastern Ring Road (to be provided by Kildare County Council) will traverse the proposed development lands in a north-south direction. Vehicular access to the proposed development will be via the new T-junction on the Maynooth Eastern Ring Road (MERR). The north-east section of the development will be accessed via a new local access road connecting the MERR. The MERR will connect the proposed development to the R148 Leixlip Road to the north and the R405 Celbridge Road to the south. The cumulative impacts of the MERR development have been assessed in greater detail in Chapter 6 of this EIAR.

The construction phase of the proposed development will primarily consist of site clearing, excavation and construction works, and the erection of the proposed new buildings on site and has the potential to impact adversely and result in the temporary degradation of the local visual environment on a short-term basis. The visual impacts precipitated by the proposed development are assessed in greater detail in Chapter 6 of the EIAR 'Landscape and Visual Impact Assessment'.

Secondary land use impacts include off-site quarry activity and appropriate disposal sites for removed spoil and other materials transported off site. The Construction Waste Management Plan addresses these issues in more detail.

The construction phase may result in a marginally increased population in the wider area due to increased construction employment in the area, however, this would be temporary in nature, and the impact would be imperceptible.

Operational Phase

The operational phase of the proposed development will result in the introduction of a greater intensity and density of residential development, delivering wider public realm improvements, and neighbourhood centre uses, in accordance with national and local planning policy objectives which seeks to deliver compact growth at suitable locations. Adequate provision of high-quality housing to serve the existing and future population of the county is an important pre-requisite and contributor to the establishment and maintenance of good human / public health. The high quality design of the proposed development, including individual units which meet and exceed the relevant standards for houses (as set out in the Quality Housing for Sustainable Communities Guidelines 2007, and the Sustainable and Compact Settlements Guidelines 2024) and apartments (as set out within the Apartment Guidelines 2025, will contribute to a positive impact on the wellbeing of future residents).

The proposed development will respond to established housing need and demand in the area of the proposed development, and the wider region. The proposed residential units will assist in addressing the significant shortfall of residential development.

The proposed development delivers a range of housing unit sizes, including one-, two-, three- and four-bedroom apartments and houses. The scheme also benefits from a high level of good quality communal and public open space, with new linkages provided through the site improving connectivity.

The delivery of 589 no. well-designed residential units, a neighbourhood centre and open space, at an appropriate location will have a direct, positive, and significant impact on the future residents of the proposed development and will support the population growth targeted for the area, at a location which is designated for residential development.

3.5.10 Health & Safety

Construction Phase

The construction phase of the proposed development may give rise to short-term impacts associated with construction traffic, migration of surface contaminants, dust, noise and littering. Secondary impacts may include resulting increased traffic arising from hauling building materials to and from the proposed development site which are likely to affect population and human health distant from the proposed development site, including adjacent to aggregate sources and landfill sites.

Construction impacts are likely to be short term and are dealt with separately in the relevant chapters of this EIAR document and will be subject to control through a Outline Construction and Environmental Management Plan and a Outline Construction Waste Management Plan. The construction methods employed and the hours of work proposed will be designed to minimise potential impacts. The development will comply with all Health & Safety Regulations during the construction of the project. Where possible, potential risks will be omitted from the design so that the impact on the demolition and construction phase will be reduced.

Operational Phase

The operational stage of the development is unlikely to precipitate any significant impacts in terms of health and safety. The design of the proposed development has been formulated to provide for a safe environment for future residents and visitors alike. The paths, roadways and public areas have all been designed in accordance with best practice and the applicable guidelines including DMURS. A Quality Audit has been undertaken which has informed the design and which is submitted as part of the application. Likewise, the proposed residential units and neighbourhood centre accord with the relevant guidelines and will meet all relevant safety and building standards and regulations, ensuring a development which promotes a high standard of health and safety for all occupants and visitors.

The proposed development will not result in any significant impacts on human health and safety once completed and operational. The proposed development therefore is unlikely to result in negative impacts in relation to population and human health in this regard and the resulting impact will be negligible.

3.5.11 Risk of Major Accidents or Disasters

Construction Phase

Having regard to the topography, nature and location of the subject site, it is not considered likely that there will be any impact related to a major accident or disaster during the construction phase of the proposed development, stemming internally from within the development, or externally. Construction activities will be temporary in nature and will be carried out in accordance with standard construction management practices and applicable health and safety legislation.

While adverse weather conditions may arise during the construction period, including periods of heavy rainfall or elevated temperatures, these do not constitute major accident or disaster risks in the context of the proposed development and will be managed through standard construction methodologies and the implementation of a Construction and Environmental Management Plan. Accordingly, no likely significant impacts related to major accidents or disasters are anticipated during the construction phase.

Operational Stage

The proposed development will be located on land which is not at any significant accident or disaster. The traffic arrangements and parking have been designed so as to avoid any risk of a major accident associated with the surrounding road network. For further details please refer to the Traffic and Transport Assessment and associated documentation prepared by ROD.

The site is located within Flood Zone C and is appropriately sited and designed to minimise the risk of flood impacts on the development, as set out within the Flood Risk Assessment Report prepared by ROD. The proposed development is considered compliant with the Planning System and Flood Risk Management Guidelines, with the FRA concluding by stating that "*The consulted sources indicate that no area of the subject site is liable to flood from fluvial, coastal or groundwater sources. All sources indicate that there is a low risk of flooding on site and that the site is within Flood Zone C, ensuring it is appropriate for residential and commercial developments.*"

In addition to flooding, consideration has been given to other potential climate-related hazards that may influence environmental conditions and population health over time, including extreme rainfall events, storm events and periods of elevated temperatures. These matters are addressed through the design and layout of the proposed development, surface water management measures, building standards and emergency access arrangements, and are assessed in further detail within Chapter 11 Climate.

Having regard to the nature and location of the site, the design of the proposed development and the mitigation and adaptation measures incorporated, it is considered that there is no significant risk related to major accidents or disasters in respect of the proposed development. The resulting impact on Population and Human Health is therefore assessed as negligible.

3.6 POTENTIAL CUMULATIVE IMPACTS

The potential cumulative impacts of the proposed development on population and human health have been considered in conjunction with the ongoing changes in the surrounding area.

The proposed development comprises a Large-scale Residential Development of 589 no. residential units, a neighbourhood centre including a childcare facility, health centre and 2 no. Class-1 shops, car and cycle parking, landscaping, public and communal open space, road upgrades and vehicular access and associated internal roads, pedestrian and cycle paths and all associated site and infrastructural works. The Maynooth Eastern Ring Road (to be provided by Kildare County Council) will traverse the proposed development lands in a north-south direction. Vehicular access to the proposed development will be via the new T-junction on the Maynooth Eastern Ring Road (MERR). The north-east section of the development will be accessed via a new local access road connecting the MERR. The MERR will connect the proposed development to the R148 Leixlip Road to the north and the R405 Celbridge Road to the south.

The subject lands are within the Key Development Area of Railpark as identified in the Maynooth and Environs Joint Local Area Plan 2025-2031. In each of the chapters, the impact of the proposed and future planned development will be considered also as other known 'committed developments' within the surrounding area.

The cumulative impact of the proposed development, along with other permitted, existing and proposed developments in the vicinity, will be a further increase in the population of the wider area. This will have a moderate impact on the population (human beings) in the area. This impact is likely to be long term and positive, having regard to the zoning objective for the subject lands, and their strategic location in close proximity to public transport and a range of services and amenities serving Maynooth, and the high level of demand for new housing in the area.

The cumulative impact on childcare demand has been assessed in the Social & Community Infrastructure Audit / Assessment, which demonstrates that childcare demand will be fully met through the proposed childcare facility, which has capacity to accommodate the entire scheme and provides additional capacity to serve demand arising from other developments in the area.

With regard to human health, the cumulative impact of the proposed development in conjunction with other nearby developments and the ongoing development on the subject site will provide for the introduction of high-quality new housing stock in the area with a high level of accessibility and amenity.

The overall cumulative impact of the proposed development will therefore be long term and positive with regard to human health for future residents of scheme who will benefit from a high quality, visually attractive living environment, with ample opportunity for active and passive recreation and strong links and pedestrian permeability, with a direct and convenient link to high frequency public transport modes. The impact on existing residents is considered to be neutral.

3.7 'DO NOTHING' IMPACT

In order to provide a qualitative and equitable assessment of the proposed development, this section considers the proposed development in the context of the likely impacts upon the receiving environment should the proposed development not take place.

A *'do nothing'* impact would result in the subject lands continuing to be used as greenfield lands. This could be considered an underutilisation of the site from a sustainable planning and development perspective, which supports increased residential densities at suitable locations within built up areas, particularly considering the proximity of the subject lands to public transport, both existing and planned,

and Maynooth Town Centre. The status of the environmental receptors described throughout this EIAR document would be likely to remain unchanged. The potential for any likely and significant adverse environmental impacts arising from both the construction and operational phases of the proposed development would not arise.

However, similarly the potential for any likely and significant positive environmental impacts arising from both the construction and operational phases of the proposed development would also not arise.

A 'do nothing' scenario would involve the subject site, which is zoned primarily for residential development and ancillary neighbourhood centre uses, not providing a residential development and remaining underutilised. The local economy would not experience the direct and indirect positive effects of the development. Failure to deliver the proposed large-scale residential development would result in existing housing need and demand remaining unmet. The objectives of the Local Area Plan for this KDA would not be achieved, and the opportunity to provide residential units at an appropriate density in the area would be missed. This would represent a sub-optimal use of zoned and serviced land which is identified for development.

3.8 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

Avoidance, remedial and mitigation measures describe any corrective or mitigative measures that are either practicable or reasonable, having regard to the potential likely and significant environmental impacts.

Construction Phase

A range of construction related remedial and mitigation measures are proposed throughout this EIAR document with reference to the various environmental topics examined and the inter-relationships between each topic. These remedial and mitigation measures are likely to result in any significant and likely adverse environmental impacts on population and human health during the construction phases being avoided. The following mitigation measures are intended to mitigate the identified potential impacts on population and human health, in addition to the specific mitigation provided in relation to other environmental topics within the other chapters of this EIAR.

P&HH CONST 1: Construction and Environmental Management Plan
It will be necessary for the appointed contractor to prepare and implement a Construction and Environmental Management Plan (including traffic management) to reduce the impacts of the construction phase on local residents, ensure the local road network is not adversely affected during the course of the construction project, and incorporate appropriate climate mitigation measures to minimise greenhouse gas emissions and enhance climate resilience during construction. The measures incorporated into the Outline Construction and Environmental Management Plan and this EIAR, including climate mitigation commitments, will inform the CEMP, which can be agreed with the Planning Authority prior to the commencement of development.

P&HH CONST 2: Construction Waste Management Plan
It will be necessary for the appointed contractor to prepare and implement a construction waste management plan in accordance with the requirements of the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects. The measures

incorporated into the Outline Construction Waste Management Plan and this EIAR will inform the CWMP, which can be agreed with the Planning Authority prior to commencement of development.

Operational Phase

The operational phase is considered to have likely positive impacts on human beings in relation to the provision of additional residential units and neighbourhood centre uses in accordance with the principles of sustainable development and zoning objectives pertaining to the site, therefore no additional operational stage mitigation measures are proposed having regard to the mitigation measures within other chapters of this EIAR.

3.9 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term permanent, temporary, positive and negative effects as well as impact interactions which the proposed development may have, assuming all mitigation measures are fully and successfully applied. It should be noted that in addition to remedial and mitigation measures, impact avoidance measures have also been built into the EIAR and project design processes through the assessment of alternatives described in Chapter 2 of this EIAR document.

Construction Phase

The construction phase of the proposed development will result in the addition of a new residential development and neighbourhood centre, comprising of 589 no. residential units and associated facilities and amenities, in the area. This will provide for a more sustainable use of the subject site and improve the residential offering in the locality, in an accessible location. Notwithstanding the implementation of remedial and mitigation measures there will be some minor temporary residual impacts on Population and Human Health most likely with respect to nuisance caused by construction activities. It is anticipated that subject to the careful implementation of the remedial and mitigation measures proposed throughout this EIAR document and as controlled through the Construction and Environmental Management Plan, any adverse likely and significant environmental impacts will be avoided. Positive impacts are likely to arise out of an increase in economic activity. The overall predicted likely and significant impact of the construction phase will be short-term, temporary and is likely to be neutral.

Operational Phase

The proposed development will result in a generally positive alteration to the existing site in terms of urban design, architecture, economic activity and provision of residential accommodation and neighbourhood centre uses in accordance with adopted land use planning policy.

The proposed development will result in a positive alteration to the existing underutilised site in terms of the provision of residential units, a neighbourhood centre including a childcare facility, health centre, and 2 no. class-1 shops, open space and roads infrastructure to serve the growing population of the area in accordance with national and regional planning policy.

Positive impacts on population and human health will include health benefits associated with the provision of a significant number of modern, well-designed and sustainable residential units, a high-quality

environment, public open space and improvements to the public realm which creates a highly permeable layout that encourages walking and cycling, amenity and recreational facilities.

A desktop wind microclimate assessment was undertaken by GIA, separate to the EIAR, and accompanies the LRD application. The assessment found that most thoroughfares, building entrances and amenity areas will provide suitable conditions for their intended use (sitting, standing or walking), benefitting from the shelter of existing or proposed buildings and landscaping. Overall, conditions within the development are expected to be suitable and safe for use from a wind and microclimate perspective and therefore there will be no potential for adverse impacts on human health from a wind / microclimate assessment perspective.

A daylight and sunlight impact assessment was undertaken by GIA and accompanies the LRD application in accordance with the BRE Guidelines (BR209, 2022). The assessment demonstrates that when considered with compensatory design measures (dual-aspect units, well-sunlit open space, private amenity provision, and high-quality internal layouts), the proposed development is concluded to provide excellent overall daylight and sunlight amenity for future residents

The implementation of the range of remedial and mitigation measures included throughout this EIAR document are likely to have the impact of limiting any adverse significant and likely environmental impacts of the operational phase of the proposed development on Population and Human Health.

The proposed development will provide for a high standard of residential accommodation. This will be a significant residual positive impact of the proposed development.

This chapter of the EIAR has provided an assessment of the likely impact of the proposed development on population and human health. As set out above, the proposed development will result in a positive impact on housing and is not likely to result in any significant adverse effects on population and human health, and will result in some other positive impacts, including provision of a sustainable density development at an appropriate location, and economic benefits derived from the employment opportunities within the neighbourhood centre proposed. Through generating additional economic activity in the area and providing for a high standard of residential accommodation, there will be a significant positive impact arising from the proposed development.

3.10 MONITORING

This section addresses the effects that require monitoring, along with the methods and the agencies that are responsible for such monitoring.

In relation to the impact of the development on population and human health it is considered that the monitoring measures outlined in regard to the other environmental topics such as water, land and soils, and noise and vibration sufficiently address monitoring requirements.

3.11 REINSTATEMENT

It is anticipated that the proposed development will realise significant positive long term overall economic and social benefits for the local community and the wider area. The proposed development will increase the population in the study area. This is considered a positive impact having regard to the New Residential and Neighbourhood Centre zoning and proximity to public transport and Maynooth Town Centre.

Strict adherence to the mitigation measures recommended in this EIAR will ensure that there will be no negative residual impacts or effects on Population and Human Health from the construction and operation of the proposed scheme. Indeed, the delivery of additional residential development will provide a significant positive long-term impact for the local area. No additional reinstatement measures are considered necessary in respect of population and human health.

3.12 INTERACTIONS

As referenced throughout the chapter, there are numerous inter-related environmental topics described in detail throughout this EIAR document which are of relevance to population and human health. This chapter of the EIAR has been instructed by updated guidance documents reflecting the changes within the 2014 EIA Directive. These documents include the EU and Irish guidelines for preparation of an EIAR and carrying out an EIA. Therefore, in line with the guidance documents referred to, this chapter of the EIAR focuses primarily on the potential likely and significant impact on Population and Human Health in relation to health effects/issues and environmental hazards from the other environmental factors and interactions that potentially may occur.

Where there are identified associated and inter-related potential likely and significant impacts which are more comprehensively addressed elsewhere in this EIAR document, these are referred to. However, the relevant environmental topic chapter of this EIAR document contains a more detailed assessment in respect of the interaction of each environmental topic with population and human health.

3.13 DIFFICULTIES ENCOUNTERED IN COMPILING

No significant difficulties were experienced in compiling this Chapter of this EIAR document.

3.14 REFERENCES

- National Planning Framework- First Revision 2025;
- Transport Impact Assessment prepared by ROD (2025);
- Quality Housing for Sustainable Communities Guidelines (2007);
- Sustainable Residential Development and Compact Settlements Guidelines (2024);
- Design Standards for Apartments, Guidelines for Planning Authorities (2025);
- Regional Spatial & Economic Strategy for the Eastern & Midland Regional Assembly 2019;
- NPF Implementation: Housing Growth Requirements (2025);
- Kildare County Development Plan 2023-2029;
- Maynooth and Environs Joint Local Area Plan 2025-2031;
- 2025 Labour Force Survey Q1 – www.cso.ie;
- ESRI Quarterly Economic Commentary, Spring 2025 – www.ESRI.ie;
- ESRI Quarterly Economic Commentary, Summer 2025– www.ESRI.ie;
- Central Statistics Office www.cso.ie;
- Climate Action and Low Carbon Development (Amendment) Act 2021;
- National Adaptation Framework 2024;
- Kildare County Council Climate Action Plan 2024-2029;
- Healthy Ireland Framework 2019-2025;
- Delivering Homes, Building Communities 2025-2030: An Action Plan on Housing Supply and Targeting Homelessness (2025)

APPENDIX 2:

CHAPTER 4
ARCHAEOLOGY, ARCHITECTURAL AND CULTURAL HERITAGE

4.0 ARCHAEOLOGY, ARCHITECTURAL AND CULTURAL HERITAGE

The Archaeology, Architectural and Cultural Heritage chapter of the EIAR has been updated to incorporate the results of archaeological test trenching undertaken on the site following submission of the original Large-scale Residential Development (LRD) application. While Items 10 and 11 of the Further Information request did not specifically relate to archaeology, architectural or cultural heritage, it was considered appropriate and necessary to update the EIAR to reflect the outcome of the post-submission archaeological investigations and to ensure that the assessment is fully informed by the most up-to-date baseline data.

4.1 INTRODUCTION

The following EIAR Chapter was prepared for the proposed Large-scale Residential Development (LRD) at Railpark, Maynooth, Co. Kildare (ITM 694600, 737000; see Figure 4.1:). It details the results of an archaeological, architectural and cultural heritage assessment prepared by Magda Lyne (MA, MIAI) and Donald Murphy (MA, MIAI) of Archaeological Consultancy Services Unit Ltd. on behalf of the applicant, Cozone Ventures Ltd.

This chapter assesses the impacts of the proposed development on the known and potential cultural heritage resources. UNESCO define the term '*Cultural Heritage'* as encompassing several aspects of tangible assets (*immovable*: archaeological sites and monuments, architectural heritage structures; *movable*: artefacts; and *underwater:* shipwrecks, submerged features) and intangible assets (e.g. folklore, oral tradition and language). Based on this assessment, the chapter then identifies appropriate mitigation strategies.

This report includes the results of a geophysical survey under licence 24R0591 (see Section 4.3.7; Figure 4.8) carried out by Donald Murphy, and test trenching carried out by Ian Russell under licence 25E0711, both of Archaeological Consultancy Services Unit (see Section 4.3.8; Figure 4.8). Both reports are also included as Appendices (Appendix 4.1 and Appendix 4.2).

The recorded and potential cultural heritage resource within the study area, encompassing both the proposed development site and the lands extending for 500m from its boundary, was assessed in order to compile a comprehensive cultural heritage baseline and context.

4.1.1 Competency of Assessor

This chapter / impact assessment was undertaken by Magda Lyne (MA, MIAI) and Donald Murphy (MA, MIAI) of ACSU. Magda is an Archaeologist with over 15 years of experience, having worked in Poland, Ireland, Denmark and Norway. Her primary focus includes preparing Archaeological and Cultural Heritage Chapters for EIARs, Archaeological Impact Assessments (AIA), and Cultural Heritage Impact Assessments (CHIA). She has completed EIARs for numerous projects across Ireland, including housing, pharmaceutical plants, wastewater facilities, and public realm projects. Donald is the founder and Managing Director of ACSU and has over 30 years of experience as an archaeological consultant. He has completed EIARs for a variety of projects across Ireland and has managed the archaeological work in advance of several large infrastructural schemes, such as the M3 and M4 Motorways. The associated test trenching was directed by Ian Russell (MA), who has over 25 years of experience in archaeology, having worked as a licence-eligible director since 1999. He has acted as Senior Archaeologist on several large infrastructural projects across Ireland, including the M1 Northern Motorway and the N25 Waterford

Bypass. He directed and published the internationally significant Viking site discovery at Woodstown and has extensive experience working on built heritage and visual impact assessments.

4.2 STUDY METHODOLOGY, POLICIES AND OBJECTIVES

This chapter's methodology is guided by a legislative framework that governs how aspects of archaeological, cultural and architectural heritage are protected. This report has been prepared in compliance with all relevant EIAR legislation and guidance, including the EIAR Guidelines from the Environmental Protection Agency (EPA, 2022). Furthermore, it addresses the relevant policies and objectives of *Kildare County Development Plan 2023–2029* and the *Maynooth and Environs Local Area Plan 2025–2031* namely:

- *Kildare County Development Plan 2023–2029*

AH O3 In co-operation with the National Monuments Service, Department of Housing, Local Government and Heritage require archaeological impact assessment, surveys, test excavation and/or monitoring and/or underwater archaeological impact assessments for planning applications in areas of archaeological importance and where a development proposal is likely to impact upon in-situ archaeological monuments, their setting and archaeological deposits, based on recommendations of a suitably qualified archaeologist and the Council will seek and have regard to the advice and recommendations of the Department of Housing, Local Government and Heritage

- *Maynooth and Environs Local Area Plan 2025–2031*

•BHO 3.1 Protect and promote the archaeological heritage of Maynooth and Environs, in particular those sites illustrated on Map 8.1 and Map 8.2 and listed in Table 8.4, and avoid negative impacts on sites, monuments, features or objects of significant historical or archaeological interest by ensuring archaeological assessments are undertaken to inform proposed development in accordance with the National Monuments Acts 1930–2014 or the Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023 (when fully commenced).

•BHO 3.2 Prioritise the protection/preservation in situ (or upon agreement preservation by record) of items of archaeological interest as listed in Table 8.4 and shown on Map 8.1 and Map 8.2 from inappropriate development that would adversely affect and/or detract from the interpretation and setting of these sites.

•BHO 3.3 Protect the historic core of Maynooth and retain, except in exceptional circumstances, the existing street layout, historic building lines and traditional plot widths where these derive from 18th Century or earlier origins.

•BHO 3.4 Encourage, where practicable, the provision of public access to sites identified on the Sites and Monuments Record under the direct ownership or control of the Local Authority and the State.

•BHO 3.5 Provide for the protection of historic burial grounds within Maynooth, in cooperation with agencies such as the Office of Public Works and the National Monuments Section of the Department of the Housing, Local Government and Heritage.

•BHO 3.6 Support the protection, preservation and promotion of the archaeological value of underwater or archaeological sites within the Plan area including any associated with the River Lyreen, Rye Water River, the Royal Canal and associated features.

Legislation, Guidelines and Policies

On 13 October 2023, the Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023 was enacted by the Oireachtas, which provides for the repeal of the National Monuments Acts 1930 to 2014 and related legislation. The act is now a law, Commencement Orders for certain provisions with enforcement measures are in effect and operational as of 31 May 2024 (S.I. No. 252/2024), 30 September (S.I. No. 492/2024) and 12 December 2024 (S.I. No. 663/2024). When fully enacted it will replace the previous legislation, but until that time the National Monuments Acts 1930 to 2014 and related legislation remain fully in force, with the exception of the successor provisions that are being fully brought into operation and have been subject to Commencement Orders. The new Act contains transitional provisions to enable certain aspects of the existing National Monuments Acts 1930 to 2014 to continue in operation, such as provisions enabling the Record of Monuments and Places to continue to have effect pending the establishment of the new Register of Monuments (see section 48 of the Act).

Below is a list of the legislation relevant to this assessment:

- Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023.
- National Monuments Acts 1930 to 2014.
- Heritage Act 1995 (as amended).
- National Cultural Institutions Act 1997.
- European Convention for the Protection of the Archaeological Heritage (Valetta Convention,1997).
- European Convention for the Protection of the Architectural Heritage (Granada Convention, 1997).
- European Landscape Convention (Florence Convention, 2000).
- Planning and Development Act 2000 (as amended).
- UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (Paris Convention, 2003).
- Directive 2011/92/EU of the European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU of the European Parliament and the Council (hereafter the EIA Directive).

Below is a list of policies, planning documents, codes of practice and frameworks relevant to this assessment:

- Framework and Principles for the Protection of the Archaeological Heritage (Department of Arts, Heritage, Gaeltacht and the Islands 1999).
- Code of Practice for Archaeology agreed between the Minister for Arts, Heritage, Regional Rural and Gaeltacht Affairs and Transport, Infrastructure Ireland (Transport Infrastructure Ireland (TII) and Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs 2017).
- Built & Archaeological Heritage: Climate Change Sectoral Adaption Plan (Department of Culture, Heritage and the Gaeltacht 2019).
- Kildare County Development Plan 2023–2029.
- Maynooth and Environs Local Area Plan 2025-2031
- National Development Plan 2021–2030 (Department of Public Expenditure and Reform 2021).

- Archaeology in the Planning Process (Department of Housing, Local Government and Heritage (DHLGH) and Office of the Planning Regulator 2021).
- A Living Tradition: A Strategy to Enhance the Understanding, Minding and Handing On of our Built Vernacular Heritage (DHLGH 2021).
- Places for People: National Policy on Architecture (DHLGH 2022a).
- Heritage Ireland 2030: A Framework for Heritage (DHLGH 2022b).
- National Planning Framework, First Revision (Government of Ireland and National Planning Framework 2025).

Below is a list of guidelines relevant to this assessment:

- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2022).
- Guidelines for Cultural Heritage Impact Assessment of TII National Road and Greenway Projects (TII 2024).
- Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) (EPA 2003).
- Architectural Heritage Protection: Guidelines for Planning Authorities (Department of Arts, Heritage and the Gaeltacht 2011).
- National Inventory of Architectural Heritage Handbook (2024).

Significance Criteria

The main purpose of this chapter is to identify, describe and present an assessment of the likely significant effects of the proposed development on archaeological, architectural and cultural heritage remains (known and unknown if present). An effect can be positive, negative, or neutral/none, direct or indirect. The effect may result from the construction phase and/or the operation phase of the project.

The potential effects are assessed for each component of the development as described above, as well as cumulatively.

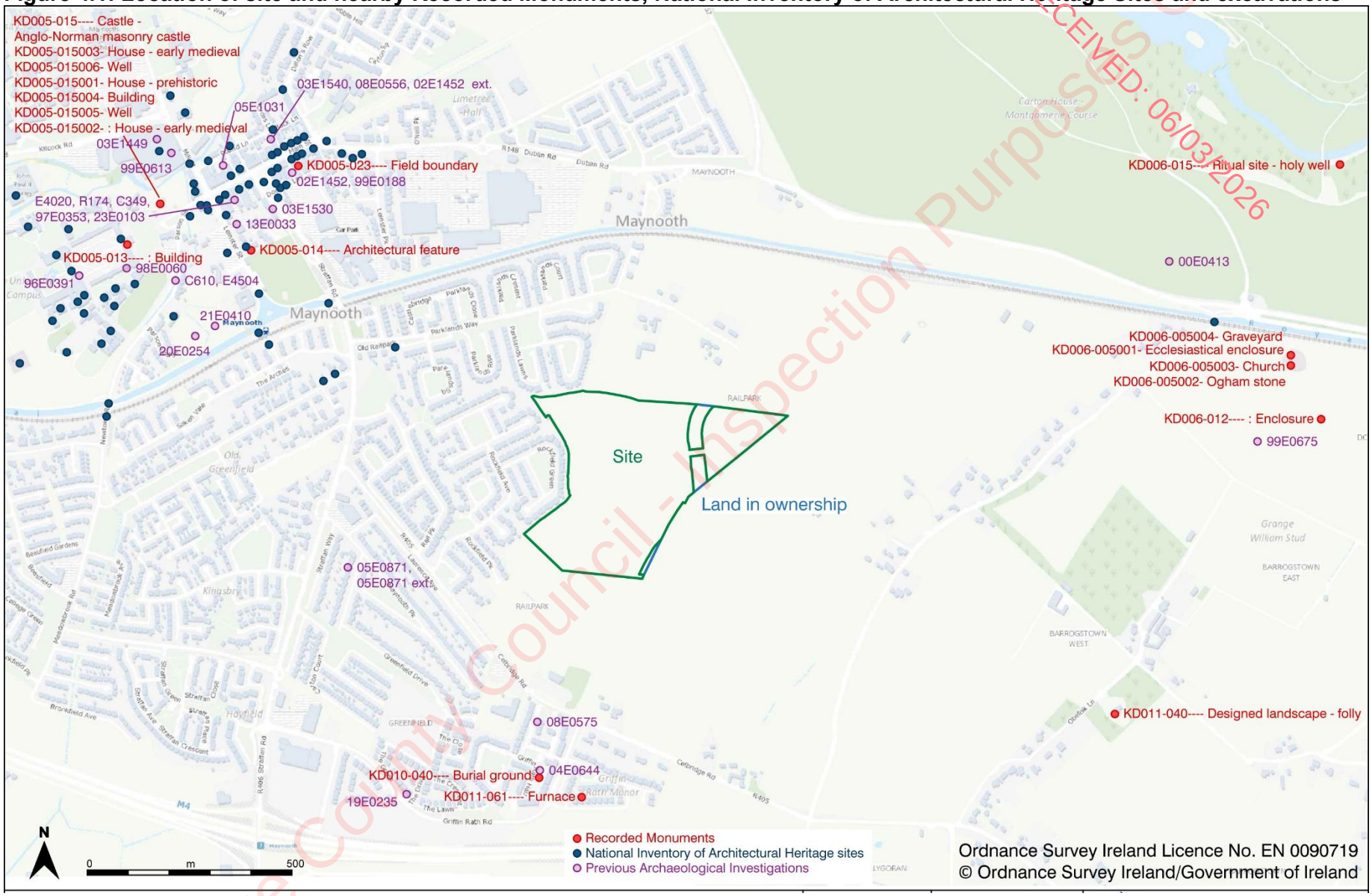
This chapter aims to present a precise, concise, accurate and credible description of the likely and significant effects on archaeological, architectural and cultural heritage, and offer mitigation measures where a likely significant effect is predicted. The description of effects follows the EPA Guidelines (2022, table 3.4, fig. 3.4), whereby comparing the character of the predicted effect to the sensitivity of the receiving environment can determine the significance

Consultations

Consultation with the National Monuments Services (NMS) of the Department of Housing, Local Government and Heritage has taken place. The NMS are aware of the project, having approved the submitted method statements and issued licences for the geophysical survey and test excavation of the site, with the reports on the findings of both submitted to statutory authorities. ACSU undertook further consultation (phone call on 18 September 2025) with the NMS archaeologist regarding the archaeological investigations for the Maynooth Eastern Ring Road (MERR). It was confirmed that at present there are no reports lodged in relation to the project. When conducting the test trenching at the Railpark site in early January 2026, the development of the MERR was underway, with the topsoil stripping of that area being monitored by an archaeologist (IAC Archaeology). Accordingly, the results of that project are not yet in the public domain.

In addition, the National Museum of Ireland, Irish Antiquities Division, was consulted, the topographical files of Ireland were reviewed, and the results are included in this chapter (Section 4.3.10).

Figure 4.1: Location of site and nearby Recorded Monuments, National Inventory of Architectural Heritage Sites and excavations



4.2.1 Documentary Sources

For the purposes of this report, archaeology, architectural & cultural heritage is considered to include the following elements:

- Sites listed in the Sites & Monuments Record (SMR)
- Record of Monuments & Places (RMP)
- National Monuments
- Archaeological sites listed on the National Monuments Service website
- Sites reported in the Excavations Database
- Any previously unrecorded sites
- A list of protected monuments
- A list of architectural heritage structures (NIAH)
- A list of protected structures (Kildare County Development Plan 2023–2029)

The following sources were consulted in order to identify and map archaeological sites within and adjacent to the proposed development site:

Sites and Monuments Record (SMR) and Record of Monuments & Places (RMP)

A primary cartographic source and base-line data for the assessment was the consultation of the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) for County Kildare (1996). All known recorded archaeological monuments are indicated on 6-inch Ordnance Survey (OS) maps (https://www.archaeology.ie/sites/default/files/media/pdf/Archaeology-RMP-Kildare-Map-(1996) 0021 .pdf) and are listed in this record (https://www.archaeology.ie/sites/default /files/media/pdf/Archaeology-RMP-Kildare-Manual-(1996)-0020.pdf) . The SMR/RMP is not a complete record of all monuments as newly discovered sites may not appear in the list or accompanying maps. In conjunction with the consultation of the SMR and RMP, the electronic database of recorded monuments that may be accessed on their website (https://heritagedata.maps.arcgis.com/apps/webappviewer/) was also consulted.

National Monuments

A List of Monuments covered by Preservation Orders and a List of National Monuments in the ownership/guardianship of the Minister for Housing, Local Government & Heritage. National Monuments in the ownership/guardianship of the Minister for Housing, Local Government & Heritage are listed on the Department's website (https://www.archaeology.ie/sites/default/files/media/pdf/monuments-in-state-care-kildare.pdf)

Excavations Database

The excavations database (https://excavations.ie/) is an annual account of all excavations carried out under license. The database includes excavations from 1970 to present. This database was consulted as part of the desktop research for this assessment to establish if any archaeological excavations had been carried out on or near to the proposed development area.

Topographical Files, National Museum of Ireland

The topographical files of the National Museum of Ireland contain information pertaining to archaeological finds (mainly artefactual) and excavations in numerous townlands throughout the country, which were reported to the museum from the 1920s. While many of these findspots are not recorded monuments, they can provide an indication of archaeological activity in a townland and consequently add to the archaeological potential of an area.

Cartographic Sources

A number of cartographic sources were also consulted as part of the desktop assessment, namely the Down Survey Map of County Kildare, Barony of Salt and Straffan (1656), Keenan and Noble's map of County Kildare (1752) and the Grand Jury map of County Kildare by Taylor (1783) as well as the first edition 6-inch (1835) and the 25-inch edition (1908-9) OS maps and available aerial photography.

Protected Structures (RPS)

The *Kildare County Development Plan 2023-2029* and the *Maynooth and Environs Local Area Plan 2025–2031* were consulted. *Kildare County Development Plan 2023–2029* contains a list of Architectural Conservation Areas and a Record of Protected Structures for the County. Both lists cultural heritage sites, buildings of historic, architectural, cultural, scientific and/or artistic interest. These are protected by the Local Government (Planning and Development) Act 1999 and the Planning and Development Act 2000, as amended, (Part IV Architectural Heritage).

Architectural Heritage Sites (NIAH)

The National Inventory of Architectural Heritage for County Kildare (https://www.buildingsofireland.ie/) was consulted to determine if any architectural heritage sites were present within the proposed development site. It contains a record and evaluation of the post-1700 architectural heritage of Ireland, as an aid in the protection and conservation of the built heritage. It provides the basis for recommendations of the Minister for Housing, Local Government and Heritage to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).

Site Inspection

A site inspection was conducted as a part of the assessment. The aim of which was to assess whether or not the site contained any visible or subsurface evidence of any previously unrecorded areas or features of historical or archaeological significance.

Additional Sources

The following additional sources were and will be consulted once complete, in order to inform the assessment of all aspects of the archaeological resource within and adjacent to the proposed development site and that the assessment is cognisant of all relevant policies and objectives.

Archaeological Impact Assessment Report. Proposed Large-scale Residential Development at Railpark, Maynooth, Co. Kildare (Lyne 2024)

Archaeological Impact Assessment (desktop) is a report based on the findings of a study of available archaeological, historical, cartographic, and photographic sources as well as a site visit. It aims to identify and describe the known and potential archaeological and cultural heritage constraints within the site and its wider environs and, where present, offer recommendations for mitigation measures. Such reports are prepared usually at pre-planning stage to inform the planning process. In this case, an Archaeological Impact Assessment Report was prepared in 2024.

Geophysical Survey Report Railpark, Maynooth, Co. Kildare (24R0591; Murphy 2025)

Geophysical Survey, in the form of magnetic gradiometry, is a non-intrusive method that is used in Irish Archaeology. It is a method for rapidly mapping archaeological objects, structures, deposits and other features, including geological anomalies, that survive beneath the ground surface. The results are presented as a grey-scale map of anomalies detected that are interpreted by an experienced archaeologist. A licence to carry out work is required and is granted by the Department of Housing, Local Government and Heritage following submission of a licence application for the site in question (in this case Licence Number 25R0591 was granted on the 18th of December to Donald Murphy). Upon completion of the survey a report detailing the results of the work carried out is submitted to the Department and the National Museum of Ireland (in this case the report was submitted to NMS and the results are included in this report see Section 4.3.7; for the full report see Appendix 4.1)

Test Trenching Report Railpark, Maynooth, Co. Kildare (25E0711; Russell 2026)

Archaeological test trenches are excavated to facilitate the early identification of archaeological deposits and features. Where test trenching is carried out following a geophysical survey, such as is the case here, the trenches are placed to (1) target anomalies detected in order to assess their significance, extent and depth and (2) access the site overall. The results allow for an informed decision on how best to deal with any discovered archaeological finds or features prior to works on site commencing. A licence to carry out work is required and is granted by the Department of Housing, Local Government and Heritage following submission of a licence application for the site in question (in this case Licence Number 25E0711 was granted on the 1st of August 2025 to Ian Russell). Upon completion of the test trenching, a report detailing the results of the work carried out is submitted to the Department and the National Museum of Ireland (in this case the report was submitted to the NMS and the results are included in this report, see Section 4.3.8; for the full report see Appendix 4.2).

4.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SITUATION)

Archaeology is considered here to include all recorded monuments listed in the Record of Monuments and Places (RMP) and in the Sites and Monuments Record (SMR), National Monuments (i.e. those in the ownership/guardianship of the state), previously unrecorded sites, sites reported in the Excavations Database if not included in the RMP and find spots or sites listed in the Topographical Files.

A number of policies and objectives of *Kildare County Development Plan 2023–2029* and the *Maynooth and Environs Local Area Plan 2025–2031* are relevant to the site (see Section 4.2). Policy AH O3 of the *Kildare County Development Plan 2023–2029* requires the proposed development be subject to a full archaeological assessment. An Archaeological Impact Assessment (Lyne 2024) was prepared by ACSU,

its findings are included in this chapter. The recommendation for the site included geophysical survey and test trenching at the pre-construction phase. A geophysical survey was since carried out (see Section 4.3.7 and Appendix 4.1 for details) and test trenching was carried out in January 2026 (see Section 4.3.8 and Appendix 4.2 for details). Any further mitigation measures necessary are in line with the objectives of the Maynooth and Environs Local Area Plan 2025–2031, namely BHO 3.1–6. The site is located to the southwest of Maynooth town and none of the sites shown on Map 8.1 and Map 8.2 and listed in Table 8.4 of the Maynooth and Environs Local Area Plan 2025–2031 are located within the current site.

4.3.1 Archaeological Background

The site is located in the townland of Railpark in the Barony of Slat North and the Civil Parish of Laraghbryan to the southwest of Maynooth town centre.

The town of Maynooth is located just inside the western edge of The Pale. The early Christian monastic centres of Laraghbryan (KD005-009001-), Taghadoe (KD010-014001-), and Donaghmore (KD006-005001-) are located within 2km of Maynooth town. Also, an early Christian burial ground (KD010-040----) was discovered in Moneycooly townland in 2004 (04E0644), located within the southeast part of the modern town. Burials of at least 55 individuals, almost all aligned east–west, were excavated (Duffy 2005).

The area of Maynooth was included in the diocese of Dublin sometime in the tenth century AD. This suggests that the area was somewhat organised and occupied before the arrival of the Anglo-Normans. This is also supported by the results of the excavations carried out in 1996 (96E0391) within the interior of Maynooth Castle. Hayden (1999) identified a prehistoric rectangular building (KD005-015001-); and two small post-and-wattle roundhouses (KD005-015002- and KD005-015003-) that pre-date the Anglo-Norman occupation. Furrows associated with the roundhouses were also excavated, suggesting agricultural activity in the immediate environs of the future castle site. A rectangular post-and wattle building (KD005-015004-) was also excavated on top of the Anglo-Norman remains of a 1m-deep sod mound.

Following the arrival of the Anglo-Normans, documentary references to Maynooth can be easily traced. In 1176, Richard de Clare, the former earl of Pembroke (Strongbow), granted the lands at Maynooth ‘Magnoded’ to Maurice Fitzgerald (c 1110–76). As a result, the area became integrated as the manor of Maynooth with an Anglo-Norman landholding system (Horner 1995). Maynooth Castle (KD005-015----; National Monument No. 485) was likely built by his son, Gerald FitzMaurice FitzGerald (c.1150–1204) to mark the acquisition of the lands in Uí Fáeláin (Kildare). Maynooth was at this time the centre of authority in the region and became the place where one of the earliest Anglo-Norman buildings in Ireland was erected. The construction likely started sometime just before 1180 and was completed by 1185, as suggested by O’Keeffe (2013), due to its similarities with the earliest phase of Trim’s donjon; furthermore, it is also likely it was built by the same mason. The original building had two floors, a basement, and a first floor. A settlement developed or grew around the castle. A chapel was part of the castle complex, likely since 1248. Edward I in 1286 issued a patent for a weekly market and annual fair. In 1316, the Fitzgerald’s became the earls of Kildare, and Maynooth was their chief fortress. However, Maynooth did not stand out from other small manorial villages in the late medieval Dublin environs. In 1328, two mills are mentioned. In the late 15th/16th centuries, the power of the Fitzgerald’s was at its height as members of the family served as the king’s lord deputy in Ireland between 1477 and 1534.

Lewis (1837) mentions that John, the sixth Earl of Kildare from the Kildare branch of the Fitzgerald family, erected a 'magnificent castle here in 1426'; he likely refers to the enlargement of the previously simple design of the donjon. During this time, the castle became 'one of the richest earl's houses under the crown of England' (Horner 1995). In 1515, the king granted a licence for the establishment of the College of the Blessed Virgin Mary of Maynooth. However, following the rebellion of Silken Thomas in 1535, the earl's estates were forfeited to the crown. Following the restoration of the estates in 1552 and the repair of the castle, little is known about Maynooth village in the second half of the 16th century. In the 1630s, Richard Boyle, earl of Cork, one of the great entrepreneurs, enlarged the castle complex. He was a guardian to George Fitzgerald, who married his daughter. In 1642, however, the great library was destroyed and the castle was left ruinous in 1647.

The Civil Survey of 1654–55 records a manor house in Maynooth, two corn mills, two malt houses, a chapel, two bridges, and several leases issued suggesting a new tenant population.

In 1678, a patent for a weekly market and two annual fairs, references to the mill, a tan house, a new shop, slaughterhouse, a schoolhouse, and several buildings, suggest late seventeenth century Maynooth was a fast-growing village, likely due to its location on the main routes to the west of Dublin. In the late 1690s a merchant, James McManus, is mentioned concerning Maynooth, and during this time a rectory and an enclosed orchard off Parson Street are developed in the western part of the village. The 1730s saw Maynooth as a post-town with the Dublin-Kinnegad-Mullingar turnpike road constructed (Horner 1995).

In late 1739, the 19th earl of Kildare decided to develop the house at nearby Carton as his principal country residence (KD006-009----). The Talbot family had erected the first Dutch-style building in Carton, recorded in a painting by Van der Hagen. Subsequently, the estate was forfeited to the Crown and in 1703 sold to Major Gen. Richard Ingoldsby, Lord Justice of Ireland. A two-storey, nine-bay pedimented front with wings was added. It was later sold to the 19th Earl of Kildare who hired Richard Castle to enlarge the house. Major work took place and by the late 1740s the house and the gardens were largely completed. A Charter School is mentioned at this time as being bounded on two sides by a road to Dunboyne, on a third by a straight, tree-lined avenue, representing Carton Avenue. It is described as extending for a kilometre from the gates at the east end of the main street to the new road, skirting the newly enlarged Carton Demesne. The avenue is in the same axis as the main street that dates to the 1750s (ibid.). In 1757, Rocque mapped Maynooth, giving insight into the organisation and the nature of plots within Maynooth village. He also depicts the current Carton Avenue.

Peter Bere, who was associated with the earl, held several leases on the main street in 1784. He and the earl were largely responsible for the redevelopment of Maynooth. Evidence of a strategy to improve the village layout can be observed as a result (Prunty and Clarke 2011). Street frontages, including the square and green areas along each side of the main street, were developed. In the 1790s, a new axis at right angles to the main street and the construction of Williams Bridge allowed long-distance traffic to be finally diverted away from the castle. The Royal Canal was built to link Dublin and the Shannon and was routed south of Carton and Maynooth. In the western part of the village, a new Roman Catholic college – the Royal College of St Patrick – was established in Stoyte House, with additional buildings constructed. This had a positive economic impact on the village, offering a source of local employment in addition to the demesne at Carton. The Roman Catholic lay college that opened in 1802 was short-lived and closed by 1820 with its properties absorbed into St Patrick's College. With the population nearly doubled since the mid-18th century, it could now be described as a small town. In the 1830s, a Presentation convent was established in the eastern part of the town, on the site occupied by the charter

school that had closed in 1819. This became the girls' national school, with a boys' school in the old chapel, both supported by the Duke of Leinster (Horner 1995).

In the 1820s, the strategy to improve Maynooth's layout, including the street framework, was nearly complete. This allowed the third duke to focus on improving the house and demesne at Carton. In 1819, the courthouse was built on the site of the former market house and shambles. In 1815, Richard Morrison was hired to remodel and enlarge Carton House for the Dukes of Leinster. It was during this time that the demesne of c. 1,000 acres was landscaped.

In 1846, the castle area in Maynooth town was bought out and cleared of houses and cabins, a garden was established here for the people of Maynooth. Only a few large houses can be noted at this time, e.g. a parochial house and a miller's house on Mill Street, and Crom-a-boo Lodge as part of the charter school site. Rows of houses were built at this time, fronting Charter School Lane, Parson Street, and later, in c. 1900, Dillion's Row of single-storey houses on the Dunboyne Road. Several lanes in the town took their names from the development – e.g. Kelly's Lane from Clement Kelly's grocery shop, Cushin, and Coates Lane, Coffey's Lane, and Doctor's Lane. In the 1850s, the most valued houses were mostly occupying both sides of Main Street.

A masterplan for the town's future development was prepared by architect A.W. Pugin in the 1850s. As a result, St Mary's Square, infirmary, chapel, the Aula Maxima (1894–5), and the great spire (1902) were constructed. The courthouse building was redeveloped to serve as a town hall with concert and meeting rooms.

The town growth weakened and in 1949 the Carton estate was sold. A large out of town scheme for housing at Greenfield, on the south side of the canal and railway. Main Street was tarred. With new water and sewerage schemes in the 1950s and the decision to admit lay students to the college, Maynooth was recognised as within the commuting range of an expanding Dublin and the town grew rapidly. In 1981, the railway was reopened and by 1994 the Leixlip-Kilcock motorway was built.

4.3.2 National Monuments

The term 'National Monument' is defined by the National Monuments Act (1930) as being 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic, or archaeological interest attaching thereto'. The aforementioned Act states that the consent of the Minister is required for archaeological works at or near a national monument in the ownership or guardianship of the Minister or a local authority or to which a preservation order applies. The Minister is required to consult with the Director of the National Museum of Ireland in relation to such an application for consent.

No National Monuments are located on or within close proximity (within 1km) to the proposed development site.

Maynooth Castle (KD005-015) is a National Monument in the state Ownership No. 485, while Connolly Folly (KD011-040) is a National Monument in the state Ownership No. 681; both are located just over 1km from the site, with Maynooth Castle c. 1015m to the northwest and Connolly Folly c. 1170m to the southeast of the site (see Figure 4.1:).

4.3.3 Recorded Monuments

There are no monuments as listed in the Record of Monuments and Places nor in the Sites and Monuments Record located within the site boundary. Five such monuments are located within 1km of the site. Two nearest a Burial Ground (KD010-040----) and a Furnace (KD011-061----), are recorded 480m and 500m, respectively, to the south of the site. As outlined in the section below, these were identified as a result of archaeological investigations (04E0644; Duffy 2004). The remaining three are at a distance of 500m or greater from the site and include two monuments located within Maynooth town, an Architectural feature (DK005-014), and a field boundary (KD005-023) both to the northwest of the site with a field system (KD010-008) to the south. The field boundary was identified as a result of archaeological investigations under licence 04E0644, while the field system was recorded from the 1970s aerial imagery. The architectural feature, a medieval doorway with a twin-light window with hood moulding is located in the Church of Ireland schoolhouse.

The following is a list of three monuments (Table 4.1) located within a 1km radius of the site (Figure 4.1:). The entry below is derived from the National Monuments Service Archaeological Survey Database.

Table 4.1: Recorded monuments within 1 km of the centre of the development site

RMP/SMR	Classification	Townland	ITM E	ITM N
KD010-040----	Burial ground	MONEYCOOLY	694439	736275
KD011-061----	Furnace	MONEYCOOLY	694532	736230
KD010-008----	Field system	MONEYCOOLY	694229	735944
KD005-014----	Architectural feature	MAYNOOTH	693737	737556
KD005-023----	Field boundary	MAYNOOTH	693847	737747

4.3.4 Previously Unrecorded Sites

No above-ground previously unrecorded sites were noted within the proposed development area during the site walkover survey carried out in August 2024 or from an examination of cartographic or aerial imagery. While a road is depicted on the 1752 map (Figure 4.3), the more detailed Grand Jury map of County Kildare of 1783 (Figure 4.4) shows the road outside and to the south of the site [note: neither the geophysical survey nor the test trenching detected the presence of the road within the site, suggesting the earlier map (1752) may be inaccurate regarding the location of the road]. The geophysical survey (24R0591; Murphy 2025) identified the presence of a ring-ditch and other anomalies of archaeological potential requiring further assessment in order to adequately mitigate the impact of the proposed development. Subsequent test trenching was carried across the footprint of the development, excluding a small area east of the MERR, which at the time was being used temporarily for topsoil storage, while the road construction was underway. The test trenching (25E0711; Russell 2026) identified features of archaeological significance in three trenches in the southern half of the site, all of which require further mitigation. These comprised two ring-ditches, four human inhumation burials, a possible third ring-ditch and a masonry structure that may represent a lime kiln.

4.3.5 Previous Archaeological Investigations

The site was subject to non-invasive archaeological impact assessment (Lyne 2024) and geophysical survey (24R0591; Murphy 2025; see Section 4.3.7 and Appendix 4.1), as well as test trenching (25E0711; Russell 2026; see Section 4.3.8 and Appendix 4.2). When conducting the test trenching in early January 2026, the development of the Maynooth Eastern Ring Road was also underway, with the topsoil stripping of that area being monitored by an archaeologist (IAC Archaeology), however, the results of that work are not yet in the public domain.

Furthermore, other archaeological investigations and assessments in the environs of the site were carried out previously and resulted in archaeological remains exposed and subsequently excavated. These include two monuments now listed as a Burial Ground (KD010-040----) and a Furnace (KD011-061----), both located to the south of the site (Figure 4.1:). These were identified as a result of archaeological investigations (04E0644; Duffy 2004). Furthermore, archaeological investigations to the south identified a ring-ditch/barrow with a Bronze Age burial urn, cremation burial pits, as well as an early medieval cereal-drying kiln and five inhumation burials (19E0235; Gallagher 2019). The sites were previously unknown, with no surface expression. Test trenching on the site of Gaelscoil Uí Fhiaich adjacent to the R405 Maynooth–Celbridge road to the south exposed no features of archaeological significance (08E0575; O'Hara 2008). [Note: 05E0871 has been geolocated by *Database of Irish Excavation Reports* in the incorrect location]. Test trenching under licence 21E0360 (Ryan 2021) of the site adjacent and to the south with 17 test trenches excavated, did not expose anything of archaeological significance with the remains of Rockfield House recorded only, and monitoring recommended.

Listed below (Table 4.2) are the nearest previous archaeological investigations undertaken in the environs of the site (Figure 4.1:), which further demonstrate the overall archaeological potential of the site and its surrounding townlands. The following information was taken from the Database of Irish Excavation Reports (www.excavations.ie).

Table 4.2: Previous archaeological investigations within the environs of the site

Excavation.ie reference	Licence No.	Site-Type	Investigation Type
2004:0851 - Moneycooly, Maynooth, Kildare	04E0644	Burial ground and Furnace Early Medieval (AD 400–1099)	Testing Monitoring Excavation
2019:693 - Greenfield, Maynooth, Kildare	17R0009 19E0235	Ring-ditch/barrow, Bronze Age burial urn, early medieval cereal-drying kiln & inhumation burials	Geophysical Survey Testing Excavation
2008:670 - Gaelscoil Uí Fhiaich, Railpark, Maynooth, Kildare	08E0575	No archaeological significance	Testing

4.3.6 Archaeological Impact Assessment (Desktop Based)

The Archaeological Impact Assessment Report (desktop based) was prepared in late August 2024 by Magda Lyne of Archaeological Consultancy Services Unit Ltd. (ACSU). The assessment was carried out to accompany the Stage 2- LRD Pre-application Consultation for a proposed Large Residential

Development. The report was based on the findings of a study of available archaeological, historical, cartographic, and photographic sources as well as a site visit. It aims was to identify and describe the known and potential archaeological and cultural heritage constraints within the site and its wider environs and, where present, offer recommendations for mitigation measures.

The report found that the site contains no monuments listed in the *Record of Monuments and Places* (RMP) or the Sites and Monuments Record (SMR) nor Protected Structures, as listed in the *Kildare County Development Plan 2023–2029*, nor any structures listed in the *National Inventory of Architectural Heritage* (NIAH). The site visit did not identify any features or archaeological significance. The site was deemed to have the potential to contain previously unknown subsurface archaeological remains due to its location within a sensitive archaeological landscape with monuments identified as a result of archaeological investigations in the past in the wider environs.

Further archaeological assessment was recommended to include a geophysical survey with test trenching of the site, including targeting anomalies identified by the geophysical survey, prior to construction commencing by a licence-eligible archaeologist working under licence from the Department of Housing, Local Government and Heritage. It was noted that any archaeological material identified may necessitate further mitigation, including preservation in situ/or preservation by record (excavation) following discussion with the National Monuments Service (given the assessments carried out on the lands, preservation by record is considered most likely, hence test trenching was undertaken prior to construction commencing).

4.3.7 Geophysical Survey (24R0591; Murphy 2025; Appendix 4.1)

The geophysical survey was conducted by Donald Murphy of Archaeological Consultancy Services Unit Ltd. (ACSU) under licence 24R0591 issued by the Department of Housing, Local Government and Heritage in consultation with the National Museum of Ireland. A full detailed gradiometer survey was undertaken throughout the application area using a Bartington GRAD 601-2 dual-sensor fluxgate gradiometer.

The site surveyed consisted of two fields. Anomalies of archaeological significance and potential were identified (see Figure 4.7). Anomaly M1 consists of a small circular enclosure measuring c. 7.5m in diameter and was interpreted as ring-ditch. Anomaly M2, while faint, is also circular and measures 8.5m in diameter and was interpreted as ?Archaeology[1] but very likely also represents ring-ditch. Ring-ditches are prehistoric monuments defined as circular or non-circular ditches usually less than 10m, these may be remains of ploughed out barrows or other types of structures, these are relatively simple morphologically. Archaeological Survey of Ireland records 149 monuments classed as ring-ditch in County Kildare.

Furthermore, geophysical survey identified scatters of other anomalies were also identified as representing potential archaeology (?Archaeology). These include a curvilinear response and sporadic small responses that could represent archaeological features such as pits, postholes, spreads and kilns but could also be of a natural origin.

[1] ?Archaeology = Anomaly representing a potential archaeology feature; its nature needs to be determined during test trenching.

Features depicted on the examined Ordnance Survey mapping were also detected, including numerous linear anomalies corresponding with former field boundaries. Linear anomalies that are not recorded field boundaries were also detected. They likely represent early field systems, drains or paths/access. Anomalies marked as Cultivation represent furrows/plough marks.

The site overall and the anomalies identified, particularly Anomalies M1 and M2 required further assessment, accordingly, test trenching at the pre-construction phase was recommended in order to further assess the site and the extent, significance and nature of the anomalies identified during geophysical survey (see Section 4.3.8 and Appendix 4.2).

Below is an extract from the geophysical survey report (Murphy 2025) detailing the anomalies identified:

Table 4.3: Geophysical survey results

Anomaly No.	Form/Nature of Anomaly	Possible Source(s) of Anomaly	Investigation Type
M1	Archaeology	Ring-ditch	Small circular ring-ditch enclosure with a c. 7.5m diameter along the western portion of Field 1. The anomaly is slightly fainter along its western side and appears to be truncated by cultivation furrows.
M2	?Archaeology	Possible ring-ditch	A faint positive curvilinear anomaly with a diameter of c. 8.5m. It lies c.40m south of M1 ring-ditch. This feature likely represents another ring-ditch; but it has a weaker response than anomaly M1.
-	?Archaeology	Curvilinear	A positive curvilinear anomaly located directly southeast of M2 may represent the partial remains of a ring-ditch but is disturbed by the buried service to the east.
-	?Archaeology	Small to medium anomalies: pits, posts, spreads, kilns, cut features	A series of positive anomalies that occur sporadically across the survey area. These might represent cut features such as pits, postholes, spreads, kilns, or other types of archaeological features. It may also be natural in origin.
-	Linear feature	Former field boundaries	Positive linear anomalies that correspond with former field boundaries depicted on the first edition Ordnance Survey (OS) 6-inch map, surveyed 1835, and the third edition Ordnance Survey (OS) 25-inch map, surveyed 1908, are located within Fields 1 & 2.
-	Linear feature	Early field systems?	Positive linear anomalies in Fields 1 and 2 may represent former field divisions that are not depicted on OS mapping.
-	Magnetic disturbance	Modern disturbance	Magnetic disturbance in the western portion of Field 1 corresponds with modern disturbance in the area from environmental trial pits.

Anomaly No.	Form/Nature of Anomaly	Possible Source(s) of Anomaly	Investigation Type
-	Buried service	Modern service	A bipolar response traversing Field 1 corresponds with the laying of a modern service that can be seen in aerial imagery from 2001-2005.
-	Cultivation	Land use/furrows	A series of cultivation furrows occurred in Field 1, predominantly in the southern portion of the field.
-	Ferrous	Magnetic disturbance from modern debris	Bipolar anomalies sporadically occur that are associated with magnetic interference from modern ferrous material, either in the topsoil or the surface of the survey area.

4.3.8 Test Trenching (25E0711; Russell 2026; Appendix 4.2)

The archaeological test trenching was conducted by Ian Russell of Archaeological Consultancy Services Unit Ltd (ACSU) under excavation licence 25E0711, issued by the Department of Housing, Local Government and Heritage in consultation with the National Museum of Ireland. This was conducted over the course of a week in early January 2026.

A total of 51 trenches were excavated down to natural (48 trenches) or the surface of archaeological remains (3 trenches) (Figure 4.8). The topsoil (C1) across the site ranged from a mid-brown clayey silt to a dark brown silty clay and measured between 0.30m and 1.00m in thickness. The natural (C2) was a stony, orange-brown boulder clay with stony grey subsoil. Features of archaeological significance were identified in Trenches 43, 45 and 53.

The test trenches targeted archaeological anomalies identified during the geophysical survey (24R0591; see Section 4.3.7 and Appendix 4.1). While no archaeological remains were identified in the areas of Anomalies M1 (Trench 36) and M2 (Trench 39), a circular ring-ditch (C4301) was uncovered in Trench 43 (Figure 4.9), which was previously identified as a curvilinear (?Archaeology) just southeast of Anomaly M2. Also discovered was a masonry structure (C4501) that represents stone walls or a possible lime kiln in Trench 45 (Figure 4.10), along with four human inhumation burials (Burials 1–4; C5303, C5305, C5306, C5307), a ring-ditch (C5302) with a possible extension (C5304) and a second possible ring-ditch (C5301) in Trench 53 (Figure 4.11).

Burial 1 (C5303) is aligned northeast–southwest and consists of a possible grave cut 1.90m in length and 0.70m in width, filled with a brown clay and evidence of human bone. This was found within a ring-ditch (C5302) that is c. 0.80–1m in width, 6m in internal diameter and filled with a fine orange-brown clay. An extension cut (C5304) measuring 0.60m in width, filled with an orange-brown clay, was also recorded to the immediate north of this ring-ditch, stopping just short of Burial 2 (C5305).

Burial 2 (C5305) is aligned east–west and measures 1.40m in length and 0.50m in width, and filled with a dark brown clay with evidence of human bone in the fill. This was identified to the immediate north of the extension cut (C5304). Burial 3 (C5306) was found immediately east of Burial 2 and it extended under the east baulk of Trench 53. It is aligned east–west, measures 1.60m in length and 0.50m in width and is filled with a dark brown clay with human bone. Burial 4 (C5307) was located to the immediate west of

Burials 2 and 3. It is aligned east–west, measures 1.80m in length and 0.60m in width and is filled with dark brown clay. Fragments of human skull were found at the west end of this feature.

Of the archaeological features uncovered, the circular ring-ditch (C4301) in Trench 43 and the masonry structure (C4501) in Trench 45 will be impacted by the construction of houses and adjacent internal roads, while the four burials (C5303, C5305, C5306, C5307) and two ring-ditches (C5301, C5302/C5304) in Trench 53 will be impacted by the construction of houses and their associated plots (Figure 4.12).

Preservation in situ (avoidance) of these archaeological remains is therefore not feasible, nor is it considered to be warranted based on the nature of the features and having regard to the planning policy framework; hence, preservation by record (fully excavated by hand) is recommended prior to any construction works commencing in these areas (see Section 4.8.1). For such archaeological features, where there are no above-ground surviving remains, preservation by record will ensure that a complete and meaningful record is preserved of all archaeological deposits, features and information. This should be conducted to the highest standard and in line with the Framework and Principles for the Protection of the Archaeological Heritage (Department of Arts, Heritage, Gaeltacht and the Islands 1999).

4.3.9 Sites Reported In The Excavations Database

There are no sites reported in the excavations database located within the site. However, to the south, the above-noted burial ground and furnace, now monuments KD010-040---- and KD011-061----, were recorded under licence 04E0644; (Duffy 2004). Furthermore, more recently archaeological investigations to the south identified a ring-ditch/barrow with a Bronze Age burial urn, cremation burial pits, as well as an early medieval cereal-drying kiln and five inhumation burials (19E0235; Gallagher 2019).

4.3.10 Topographical Files

The topographical files of the National Museum of Ireland were consulted. There are no finds listed for Railpark townland. However, there are eleven finds listed for Maynooth, these include two stone axeheads (NMI Reg. No. 1945:259; 1967:101), a lead object (NMI Reg. No. 1995:2003), a bronze brooch (SA1925:8) and six copper alloy finds, comprising four rings (NMI Reg. Nos 1995:2004–2007), a button (NMI Reg. No. 1995:2001) and a mount (NMI Reg. No. 1995:2002).

4.3.11 Placename Evidence

The database of Irish placenames, www.logainm.ie was consulted for the meaning of the placenames within and surrounding the proposed development site.

The site is fully within Railpark townland, located within the Parish of Laraghbryan and the Barony of Salt North. Railpark (Páirc an Ráille) was recorded in 1744 as Rayld Park (https://www.logainm.ie/en/25437). In 1837 it was noted as formerly called Mill Farm, with the name Rail Parks used from the late 18th century onwards.

4.3.12 Record of Protected Structures

The *Kildare County Development Plan 2023-2029* was consulted to determine if any protected structures were present within the proposed development site. In addition, the *Maynooth and Environs Local Area Plan 2025-2031* was also reviewed. No such structures were listed within the site boundary.

The nearest such structure is Lime Kiln (B06-06), located c. 310m to the northeast of the site.

4.3.13 National Inventory of Architectural Heritage (NIAH)

In addition, the database of the National Inventory of Architectural Heritage was also consulted.

A section of Royal Canal (NIAH Reg. No. 11803136) is recorded due to its dressed stone retaining walls, with the canal c. 380m to the north of the site.

4.3.14 Cartographic Sources and Aerial Imagery

Cartographical sources and aerial imagery were examined.
Potential archaeological or cultural heritage features are marked on maps and provide a useful resource in identifying sites particularly if they no longer have any above-ground remains.

A review of the available aerial photography for the area was also undertaken as part of this assessment. Unrecorded archaeological sites can often be identified in aerial photographs as cropmarks or differential growth in a field.

Cartographic Sources

A review of available historic mapping for the area was carried out to include the Ordnance Survey (OS) of Ireland 6-inch (1835; see Figure 4.5) and 25-inch (1908-09; see Figure 4.6) maps, as well as pre-Ordnance Survey mapping that includes the Down Survey (1654–57; see Figure 4.2), Keenan and Noble's map of county Kildare (1752; Figure 4.3) and Taylor's map of County Kildare (1783; see Figure 4.4). Potential archaeological or cultural heritage features are often marked on such maps, and they can provide a useful resource in identifying sites, particularly if they no longer have any above-ground remains.

Pre-Ordnance Survey mapping examined does not give any detail in relation to the site; however, a road is shown traversing the site on the 1752 map, but the more detailed Grand Jury map of County Kildare of 1783 shows the road outside and to the south of the site, suggesting that the earlier map may be inaccurate regarding the location of the road. As stated above (Section 4.3.4), neither the geophysical survey nor the test trenching detected the presence of this road within the site.

The site is depicted as incorporating part of four agricultural fields on the 1835 OS map (Figure 4.5), with one of these field boundaries removed by the time of the 1908 OS map, which also depicts a spring abutting the northern boundary (Figure 4.6). This might suggest that this boundary of the site, depicted as a narrow strip on the 1835 map, was not a road/track but a wet ditch.

No features of archaeological significance were recorded on the examined mapping; however, the line of the road depicted on the 1752 map may be considered historically significant if the mapping is accurate and an abandoned 18th-century road did once cross this field; however, no remains of this road can be seen on the geophysical survey.

Figure 4.2: Extract from Down Survey map of the County of Kildare, Barony of Salt and Straffan (1656), showing approx. location of site.

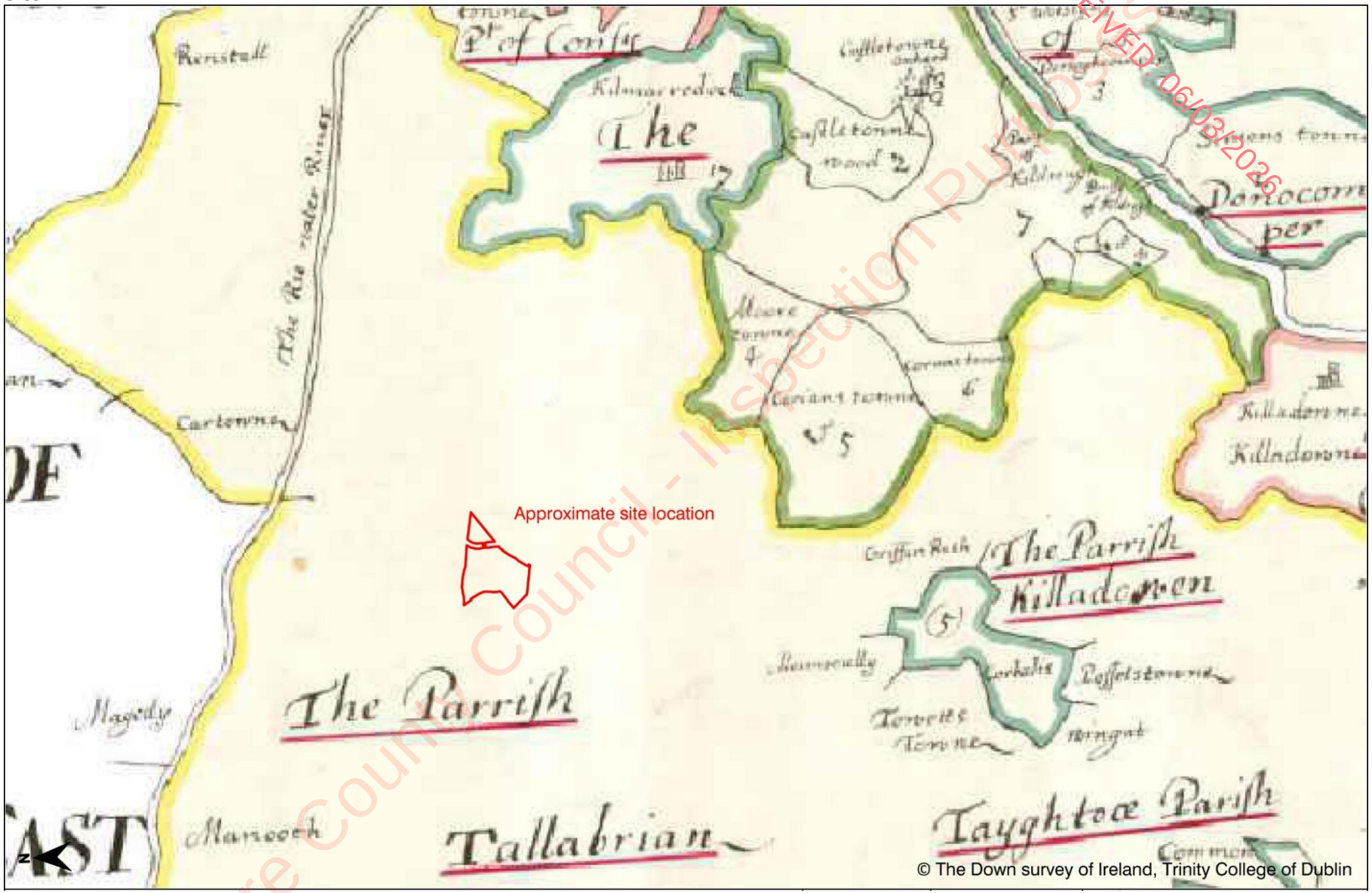


Figure 4.3: Extract from Keenan and Noble's map of County Kildare (1752), showing approximate location of site.

Figure 4.4: Extract from the Grand Jury map of County Kildare by Taylor (1783), showing approximate location of site.

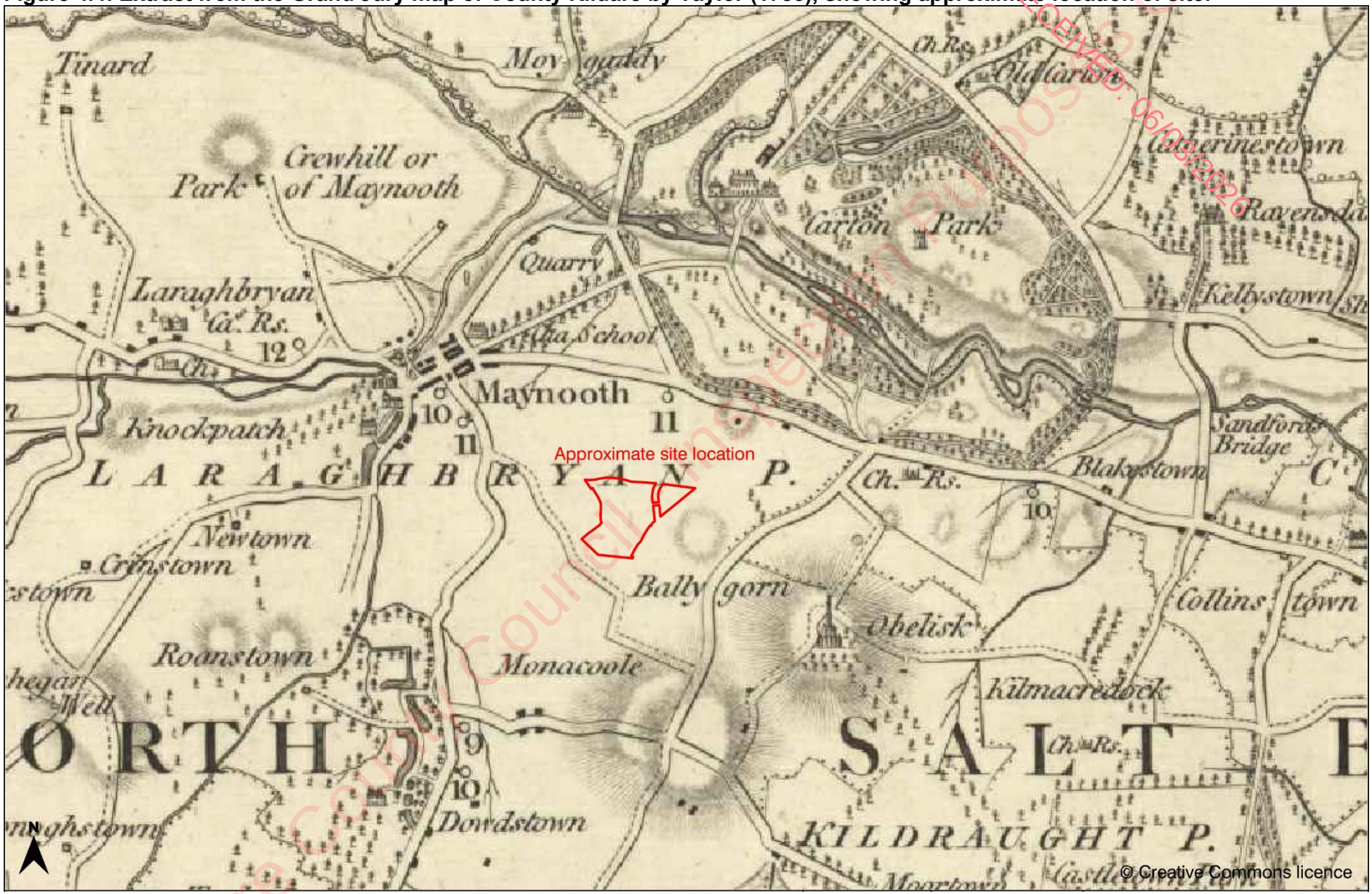


Figure 4.5: Extract from 1st edition Ordnance Survey (OS) 6-inch map (surveyed 1835 - published 1837), showing location of site.

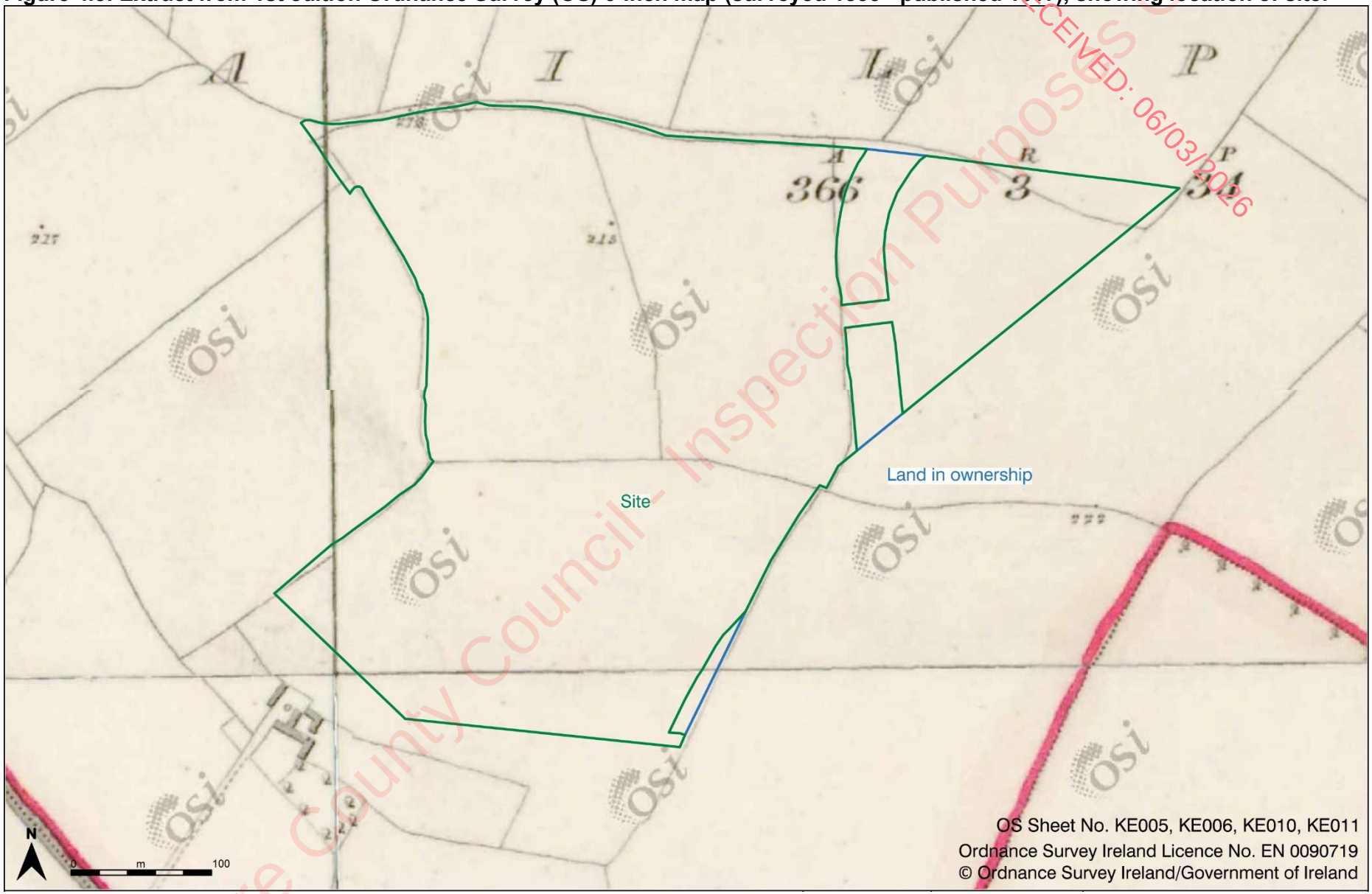


Figure 4.6: Extract from 3rd edition Ordnance Survey (OS) 25-inch map (surveyed 1908–09 - published 1910), showing location of site.

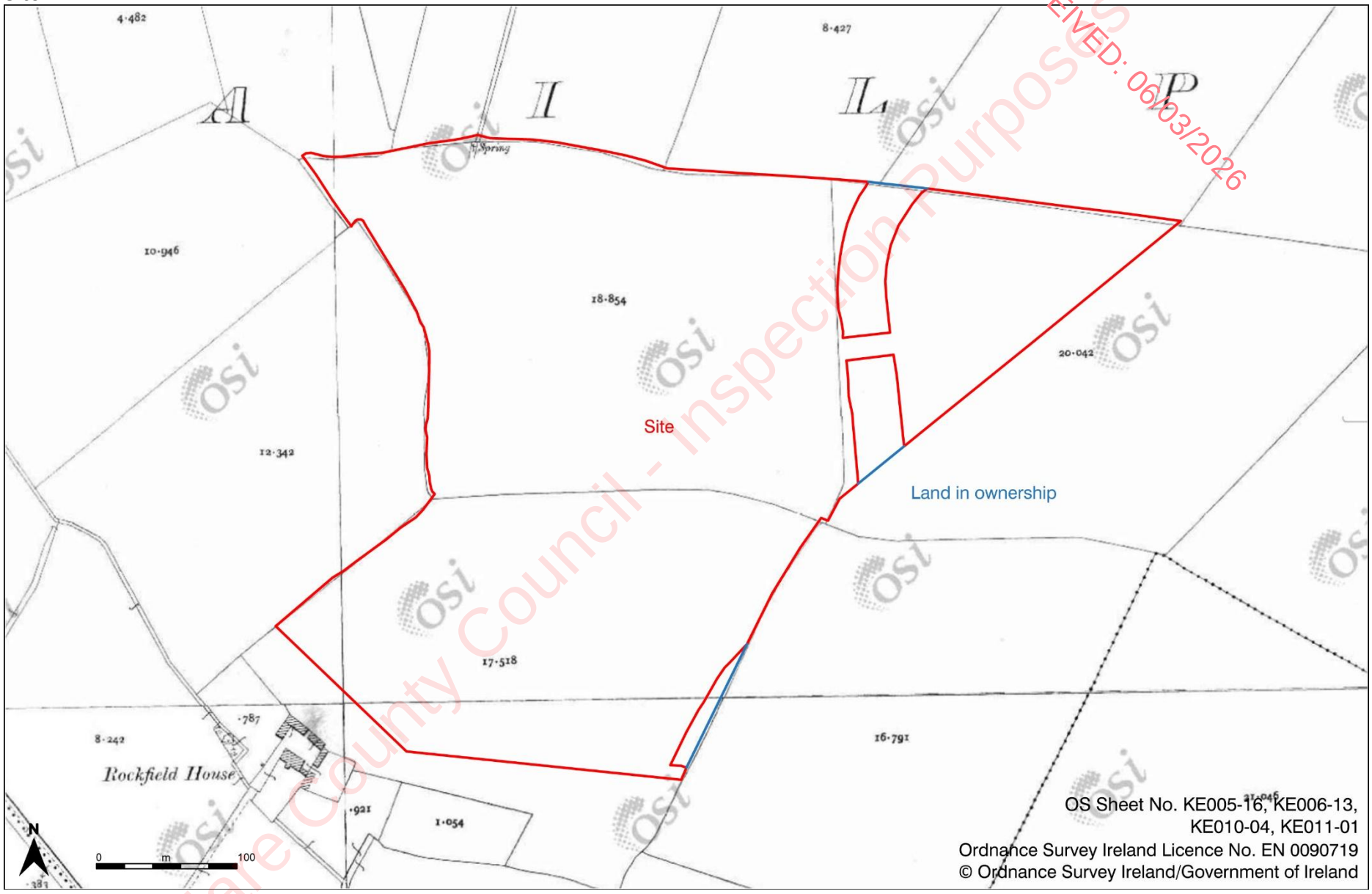


Figure 4.7: Aerial view of site.

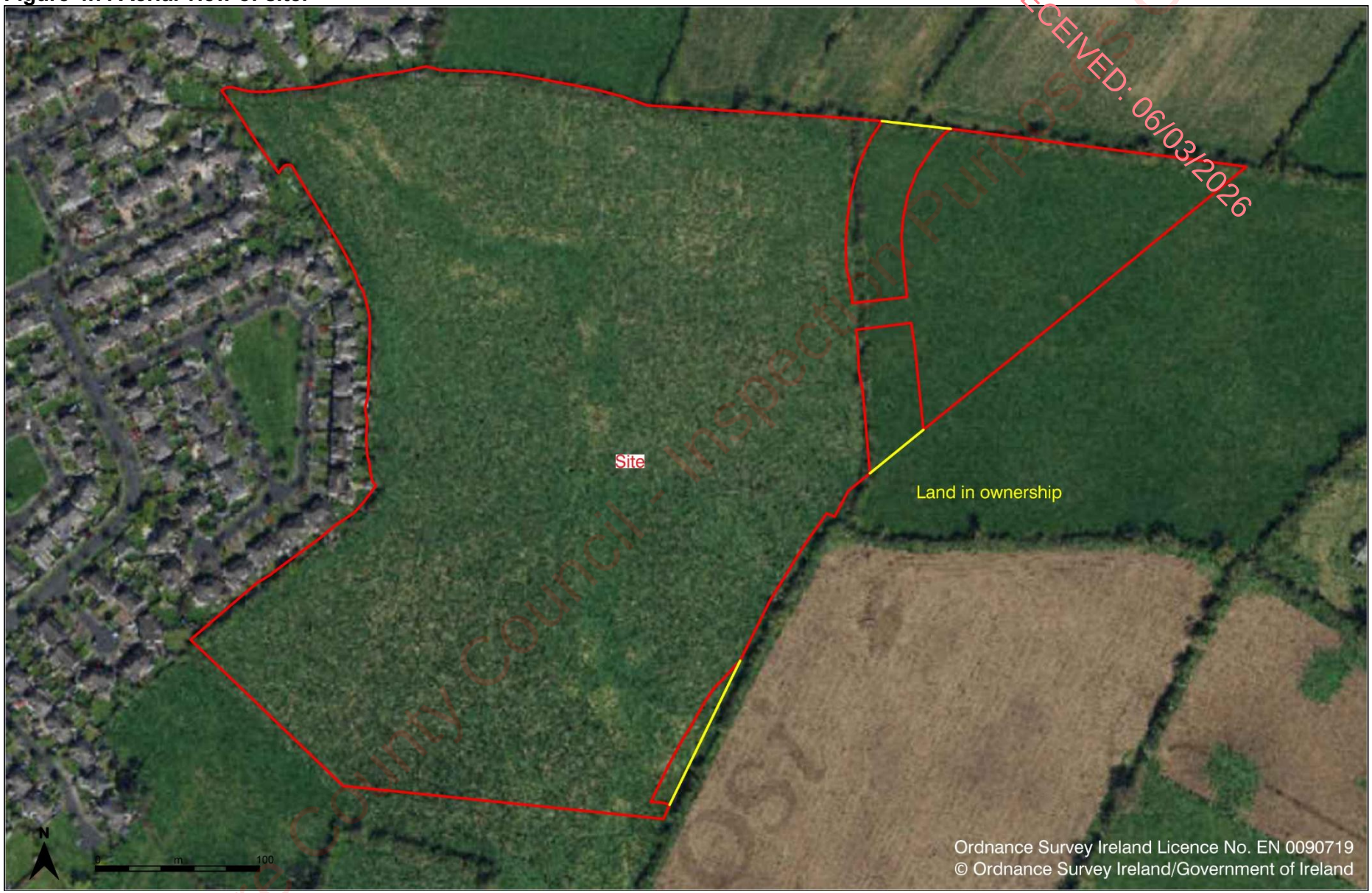


Figure 4.8: Details of site development, showing geophysical survey interpretation, trenches and identified features.

Figure 4.9: Detail of identified archaeological features in Trench 43.

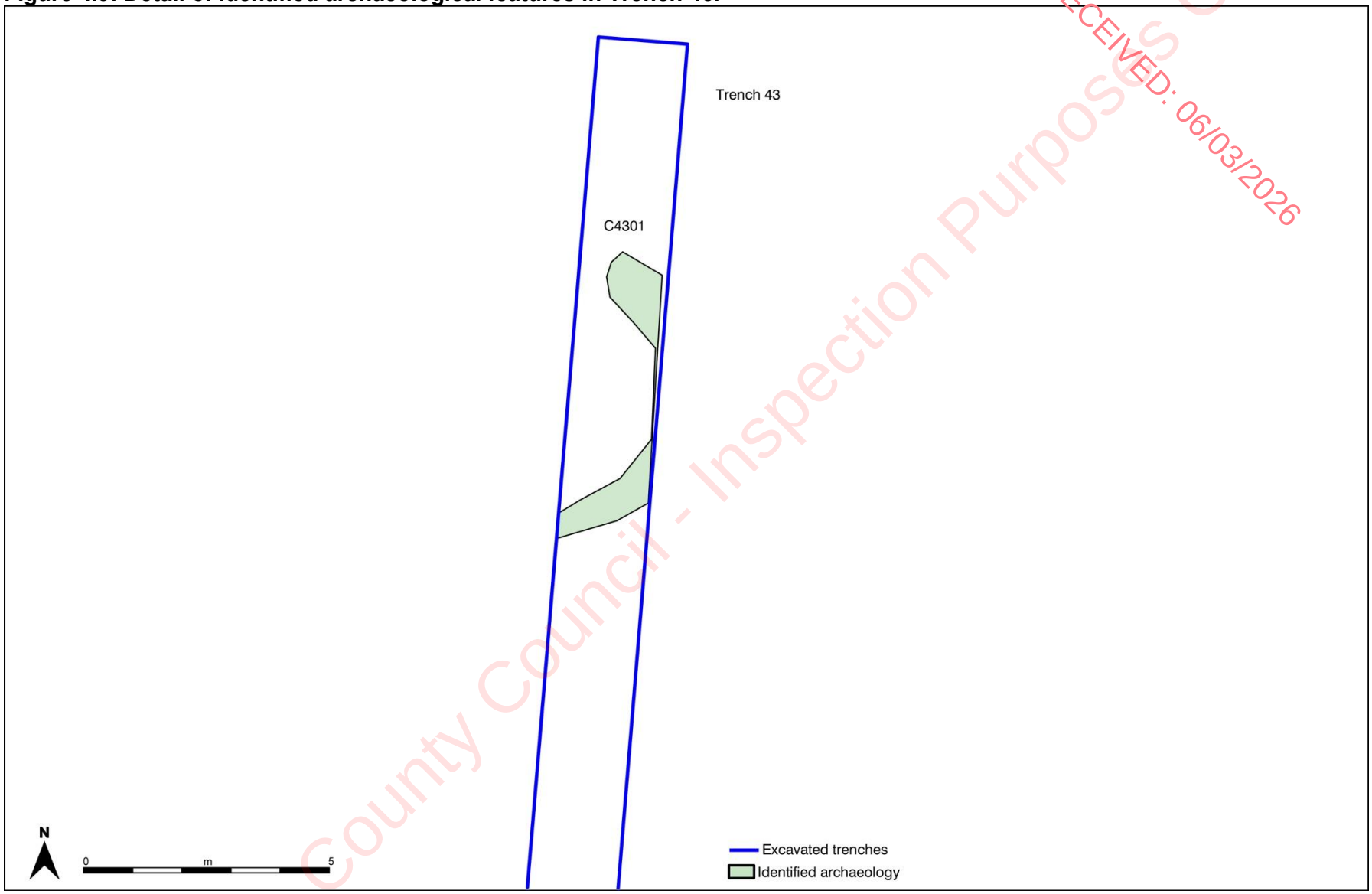


Figure 4.10: Detail of identified archaeological features in Trench 45.

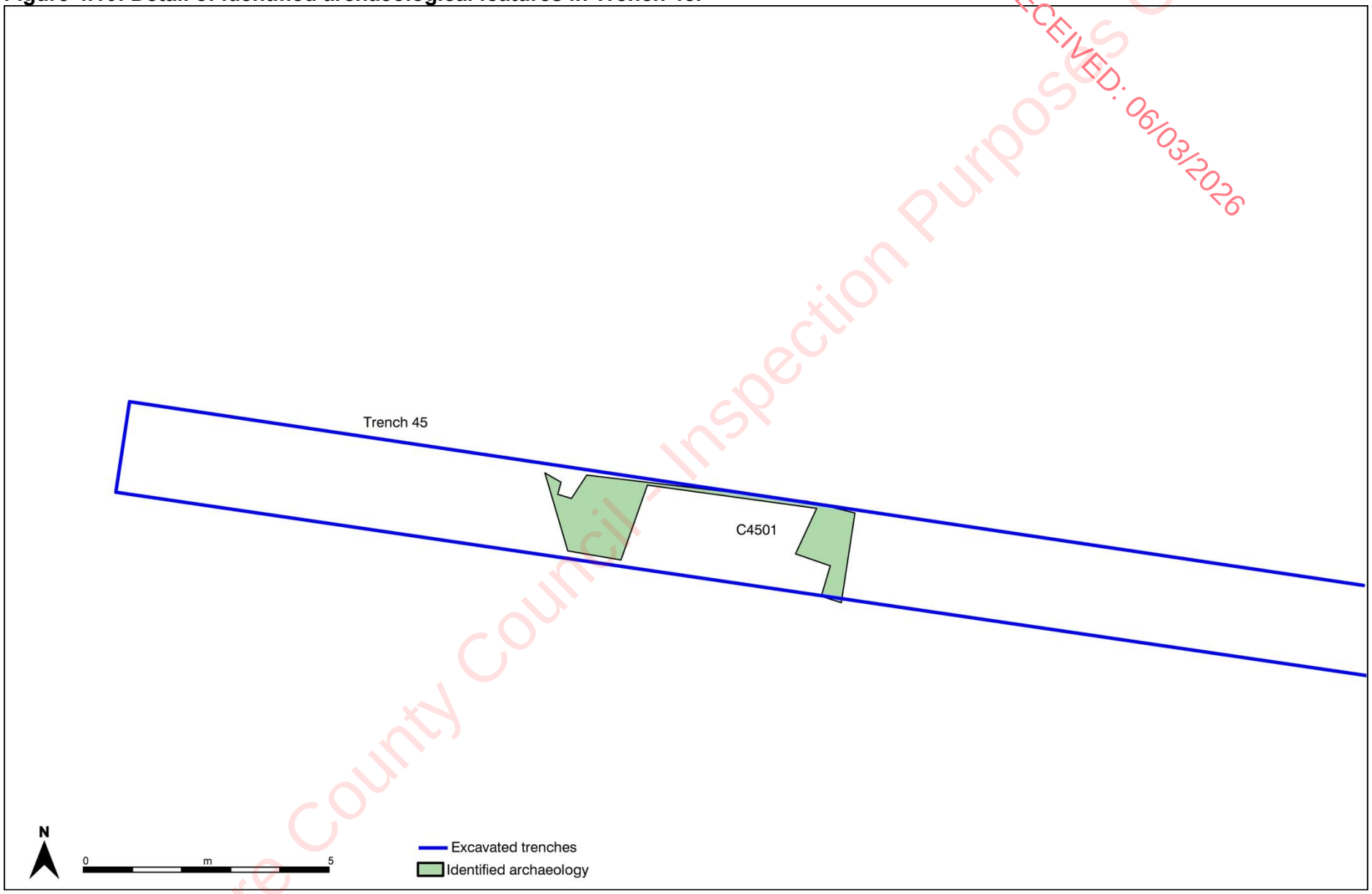


Figure 4.11: Detail of identified archaeological features in Trench 53.

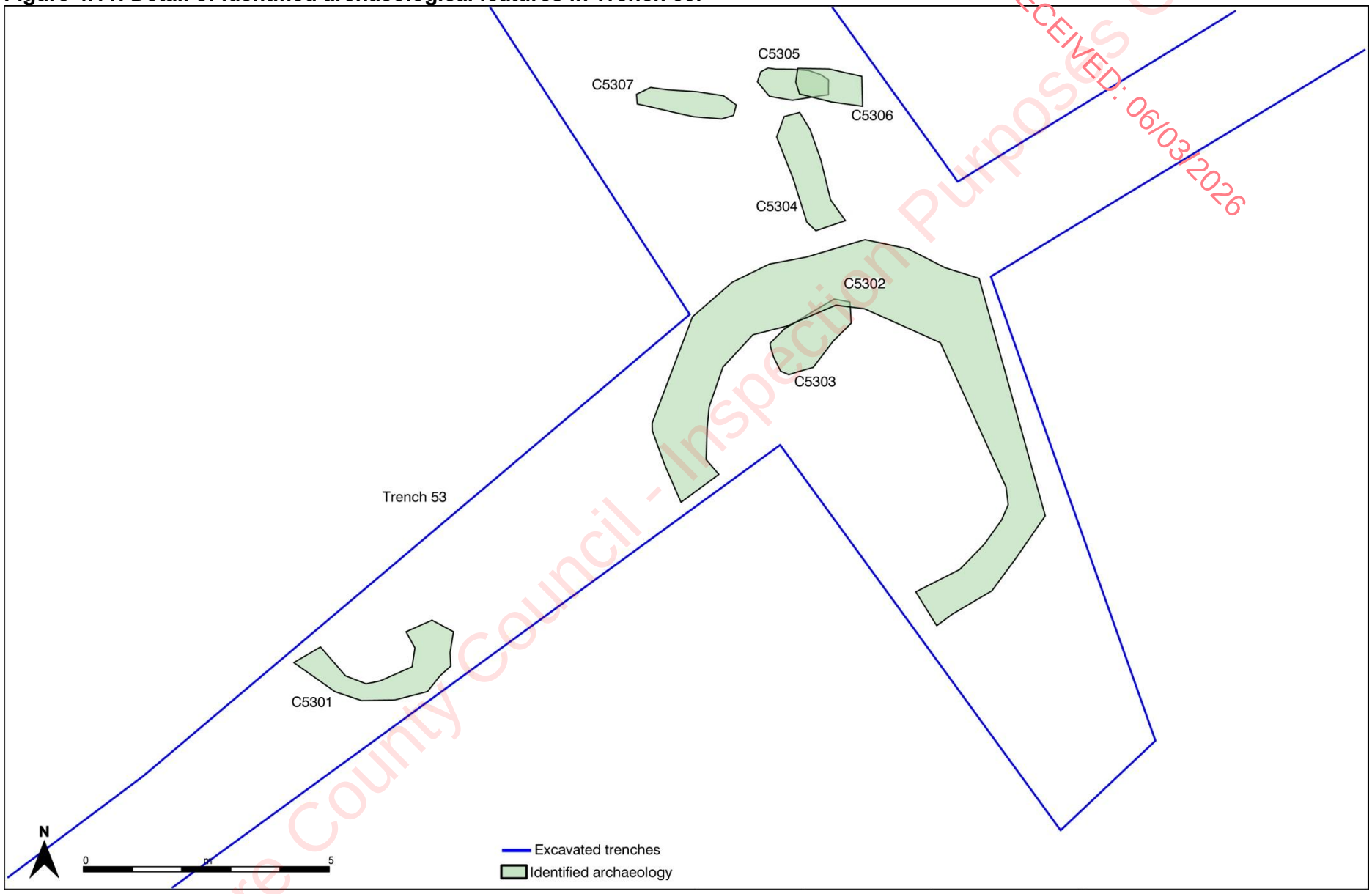
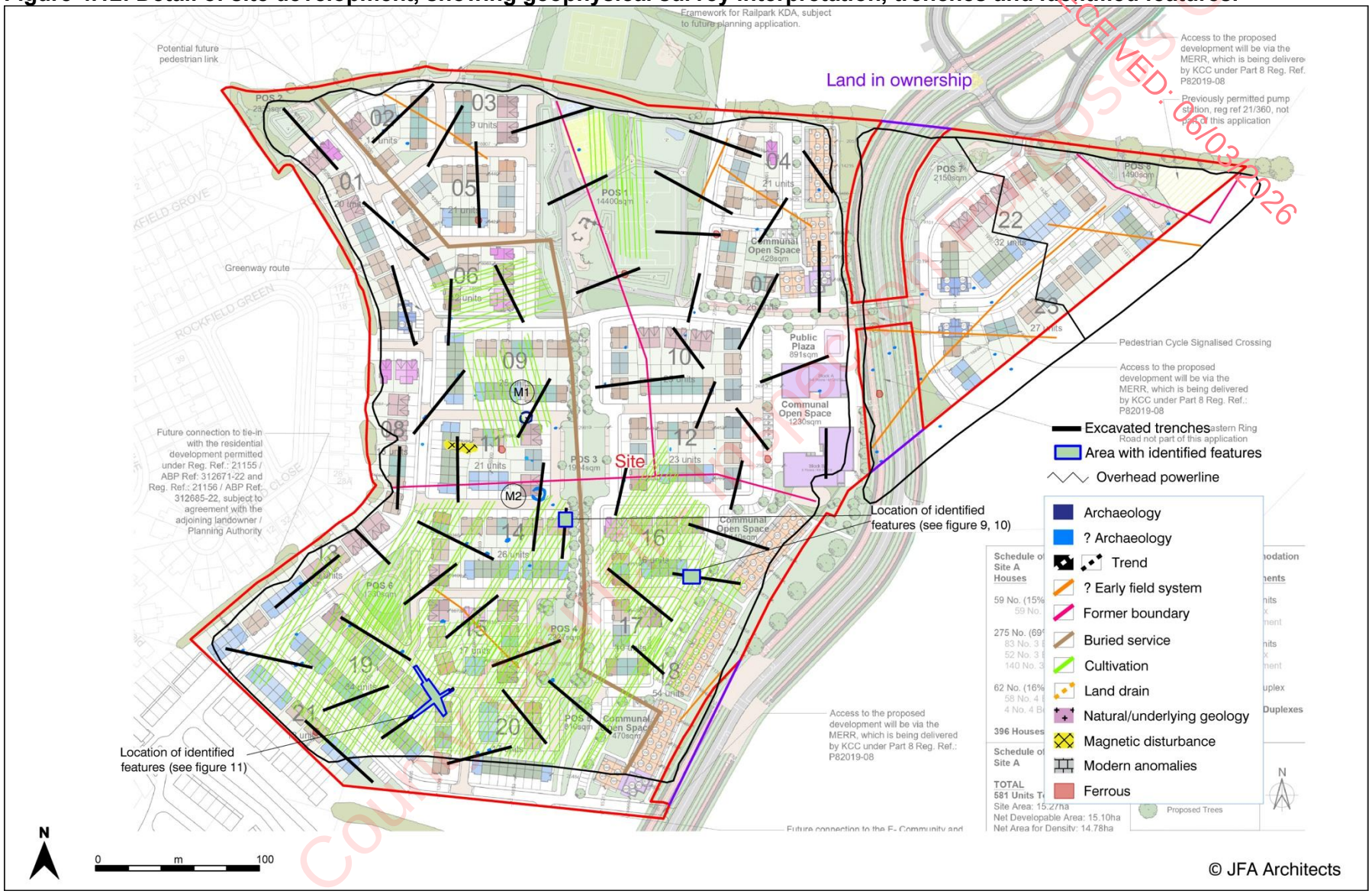


Figure 4.12: Detail of site development, showing geophysical survey interpretation, trenches and identified features.



Aerial Imagery

By the time of the 1995 aerial, further field boundaries had been removed, and on the 2001–2005/2006–2012 aerial images, a wide strip traversing the site roughly northwest to southeast was visible. It likely represents a service pipe. The area was returned to pasture thereafter but the route of the pipeline is visible as a linear cropmark on subsequent aerial images.

Faint, parallel linear cropmarks were observed on the 2021 aerial imagery in the area adjacent and south of the site; these correspond with test trenches excavated (21E0360; Ryan 2021). Aerial imagery from late 2024 illustrates it under construction, with an area directly adjacent and south of the current site stripped of topsoil (likely for service). Parallel linear cropmarks that could represent test trenches are visible to the north of the site on the most recent aerial imagery from Google Earth (May 2025). At present, there is no record of these on excavation.ie.

No features of archaeological significance were recorded on the examined aerial imagery.

Figure 4.13: Overview of the site facing east (Plate 1) and west (Plate 2) respectfully

4.3.15 Site Inspection

A site inspection was conducted by Kevin White of ACSU in August 2024. The site consists of portions of two fields and is currently a tall meadow (see Figure 4.6) with boundaries consisting of mature hedges, trees and post and wire fence. No features of archaeological significance were noted during this field inspection.

4.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development area measures c 15.27 hectares and is located on the eastern side of Maynooth, south of the Dublin-Sligo railway line and the Royal Canal, known as Railpark. The site is currently in agricultural use, but forms part of the designated Key Development Area at Railpark under the Maynooth and Environs LAP. The site is adjacent to established residential neighbourhoods at Parklands and Rockfield.

The character of the land is agricultural. There are boundary hedgerows along the northern and western boundaries of the site, the northern hedgerow being the most complete. The hedgerow along the western

boundary with Rockfield is fragmented with many gaps where vegetation has been removed, possibly pruned. There are ornamental trees and hedging planted in adjoining gardens intermingled with the hedgerow. There is also a hedgerow running north-south through the site and along the southeastern corner.

The application is for residential development to provide a total of 589 no. residential units consisting of 220 no. apartment / duplex units and 369 no. houses as well as a neighbourhood centre with commercial space, apartments, a childcare facility, outdoor play area, a retail, health centre, pharmacy, as well as 2.79 ha of public open space.

A Part 8 application (Reg. Ref.: P82019-08) was approved by Kildare County Council on the 29th of July 2019 for the Maynooth Eastern Ring Road (MERR), which will provide a link between the R405 Celbridge Road and R148 Leixlip Road, including a bridge over the Royal Canal and railway line. The route of this link road is orientated through the subject lands, and we note that the LAP requires the MERR to be constructed prior to or in tandem with the development of the new residential development within the Railpark KDA.

The subject lands are strategically located adjacent to and accessed from the MERR, which in turn forms a strategic element of the overall Maynooth Outer Orbital Route, which is of strategic importance to the future and significant planned growth for the 'Key Town' of Maynooth.

The Maynooth Eastern Ring Road (to be provided by Kildare County Council) will traverse the proposed development lands in a north-south direction. Vehicular access to the proposed development will be via the new T-junction on the Maynooth Eastern Ring Road (MERR). The north-east section of the development will be accessed via a new local access road connecting the MERR. The MERR will connect the proposed development to the R148 Leixlip Road to the north and the R405 Celbridge Road to the south.

For a full description of the proposed development, see Chapter 2 of this EIAR and the application drawings.

4.5 POTENTIAL EFFECTS OF THE PROPOSED DEVELOPMENT

The following outlines the potential impacts in advance of mitigation measures proposed.

4.5.1 Effects On Recorded Archaeological Monuments

There will be no effects, indirect or otherwise, on recorded archaeological monuments (RMPs/SMRs) as no such monuments are located within the proposed development site. The nearest monument to the site is a Burial Ground (KD010-040----) recorded 480m to the south of the site, and no indirect or visual effect on this monument was noted.

4.5.2 Effects On Known and Potential Archaeological Features

The proposed development will have a profound and negative impact on the nine archaeological features identified during the test trenching (25E0711; Russell 2026). This includes one circular ring-ditch (C4301) uncovered in Trench 43, which was previously identified during the geophysical survey (24R0591; Murphy 2025) as a curvilinear (?Archaeology) just southeast of Anomaly M2 (Figure 4.9). Notably, no

archaeological remains were identified during the test trenching in the areas of Anomalies M1 (Trench 36) and M2 (Trench 39), although this does not exclude the possibility that archaeological features may yet be uncovered in the environs of these anomalies. The other archaeological features identified consist of a masonry structure (C4501) that represents stone walls or a possible lime kiln in Trench 45 (Figure 4.10), along with four human inhumation burials (Burials 1–4; C5303, C5305, C5306, C5307), a ring-ditch (C5302) with a possible extension (C5304) and a second possible ring-ditch (C5309) in Trench 53 (Figure 4.11). All of these features will be directly impacted by the construction of houses, their associated plots and adjacent internal roads.

A potential effect on the archaeological resource also lies in the uncovering of sub-surface archaeological features during groundworks associated with the proposed works and associated infrastructure. This is because anomalies of archaeological potential were identified as a result of a geophysical survey (24R0591; Murphy 2025), with subsequent test trenching (25E0711; Russell 2026) confirming the presence of definite archaeological remains. Should additional archaeological features be present, including any evidence for the road depicted within the site as shown on the 1752 map, the proposed development will have a negative, permanent and profound effect on such remains.

4.5.3 Architectural and Cultural Heritage

There will be no effects on architectural heritage as no Protected Structures, sites listed within the National Inventory of Architectural Heritage (NIAH), or vernacular structures, are located within the proposed development site.

4.5.4 Indirect Effects

Indirect effects are those whereby the proposed development may have a negative (or positive) effect on the wider archaeological landscape or surrounding architectural heritage. Indirect effects may include a visual impact on the surrounding archaeological landscape.

The introduction of the proposed development to the area will not result in a change to the general setting of any of the monuments or protected structures as none are present within or in the immediate environs of the site. The site consists of grassed fields bounded from the west by residential development.

The proposed development will therefore have no indirect effects, either temporary or permanent, on the wider cultural heritage of the area.

4.6 'DO-NOTHING' EFFECT

If the proposed development were not to proceed there would be no negative impact on the archaeological, architectural or cultural heritage resource of the proposed development area.

4.7 CUMULATIVE EFFECTS

There are no known cumulative effects on the Archaeological and Cultural Heritage resource of the area as a result of the proposed development.

In recent years, a number of small and large-scale developments were proposed and approved in the environs of the site by Kildare County Council (21155 / ABP Ref. 312671-22; 21156 / ABP Ref.: 312685-

22; 211108; 2461139 2460774). Reg. Ref.: 21155 / ABP Ref. 312671-22 and Reg. Ref.: 21156 / ABP Ref.: 312685-22 refers to the lands located adjacent and to the south of the subject lands. Test trenching carried out under licence 21E0360 (Ryan 2021) prior to groundworks did not identify any features of archaeological significance with the remains of Rockfield House found and monitoring recommended.

The Maynooth Eastern Ring Road (MERR), permitted under Reg. Ref.: P82019-08, also intersects the proposed development site, as shown in the JFA Site Layout drawings (FIGURE 4.11). The EIA screening report in respect to the MERR issued in 2019 states the following archaeology mitigation measures are to be carried out:

> "*For archaeology, ground disturbances associated with the proposed development in greenfield areas will be monitored by a suitability qualified archaeologist during the construction phase. If any features of archaeological potential are encountered, further archaeological mitigation may be required, such as preservation in-situ or by record. A pre-construction condition survey will be carried out for the boundary wall of Carton Demesne to ensure that the wall will not be impacted by the very limited construction works nearby."*

When conducting the test trenching at the Railpark site in early January 2026, the development of the MERR was underway, with the topsoil stripping of that area being monitored by an archaeologist (IAC Archaeology). Accordingly, the results of that project are not yet in the public domain.

4.8 AVOIDANCE, REMEDIAL AND MITIGATION MEASURES

4.8.1 Pre-Construction Phase

The following mitigation measures will be carried out subject to the approval of the National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage (DHLGH) and further mitigation may be sought by the NMS.

ARCH PRE-CONST 1: Archaeological Preservation By Record – Excavation

- Mitigation will be required in the form of excavation with the use of a metal detector of the areas of archaeological activity identified, prior to any site work commencing. While preservation in situ is the preferred option in which to conserve the archaeological resource, this is not warranted or feasible in this case. Hence, preservation by record of the identified archaeological remains will be carried out by a licence-eligible archaeologist in consultation with and under licence from the NMS of the DHLGH. Consultation with the NMS will be maintained throughout. The archaeological sites are as follows:
  - Inhumation burials (C5303, C5305, C5306, C5307), ring-ditch (C5302), extension (C5304) and curvilinear feature/ring-ditch (C5301).
  - Ring-ditch (C4301).
  - Masonry structure (C4501).
  - Any additional archaeological remains that are identified when the areas around the above sites are stripped of topsoil under archaeological supervision.
- Adequate time and resources will be provided by the developer for the resolution of any archaeology identified during the excavation of the above areas, which will be directly impacted by groundworks. Time and resources will also be allowed for any post-excavation work and specialist analysis necessary following the archaeological excavation of these sites.
- A report is required to be compiled on completion of any archaeological excavation and will be submitted to the relevant authorities.

4.8.2 Construction Phase

Archaeological Heritage

There is potential for the presence of additional isolated archaeological features to be present in areas that were not assessed during the pre-construction phase (f.ex. between test trenches and outside of the areas that will be stripped for excavation). This includes the area east of the Maynooth Eastern Relief Road that was not accessible for test trenching due to the temporary storage of topsoil, and any other areas in the vicinity of the MERR that were previously inaccessible during works related to the road.

The following mitigation measures will be carried out subject to the approval of the National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage (DHLGH) and further mitigation may be sought by the NMS.

ARCH CONST 2: Topsoil Stripping

- As a result of the identification of significant archaeological features during test trenching, further mitigation will be required in the form of monitoring of topsoil stripping across the site with the use of a metal detector during the construction phase. This is in relation to all groundworks associated with the proposed development, including the previously inaccessible areas adjacent and east of the MERR. The use of appropriate machinery to ensure the preservation and recording of any surviving archaeological remains will be necessary.
- This monitoring will be carried out by a licence-eligible archaeologist in consultation with and under licence from the NMS of the DHLGH. Accordingly, no ground disturbance will take place in the absence of the Archaeologist without his/her express consent. Should any significant archaeological features be discovered, further archaeological mitigation may be required, such as preservation by record. Any further mitigation will require approval from the NMS.
- Adequate time and resources will be provided by the developer for the resolution of any archaeology identified within the development site during the construction phase and which will be directly impacted by groundworks. Time and resources will also be allowed for any post-excavation work and specialist analysis necessary following any archaeological excavation that takes place.
- A report is required to be compiled on completion of any archaeological monitoring and/or excavation and will be submitted to the relevant authorities.

The above mitigation will be included in the Construction Environmental Management Plan, which will be prepared and submitted to the Planning Authority prior to commencement of development.

Architectural and Cultural Heritage

No mitigation is required.

4.8.3 Operational Phase

Archaeological Heritage

There will be no mitigation required, as the effects of the proposed development on the archaeology will be mitigated prior to the operational phase in line with the mitigation measures outlined in Sections 4.8.1 4.8.2.

Architectural and Cultural Heritage

No mitigation is required.

4.9 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

The residual effects are likely to be neutral and none to imperceptible if the mitigation measures (see Section 4.8) are implemented. Table 4.4 below summarises the residual effects of the proposed development on the archaeological landscape.

Residual impacts are defined as the overall effect of the development on archaeology, on the basis of implementing the mitigation measures recommended in this report.

Table 4.4: Residual effects and mitigation strategies

Potential Effects	Mitigation strategy	Residual impacts
Construction Effects		
Topsoil removal associated with development. Groundworks and service trenches, etc.	Advance archaeological assessment of the site, including test trenching targeting anomalies identified on geophysical survey and the site overall (with the potential footprint of the road as shown on the 1752 map also targeted), followed by preservation by record (archaeological excavation) of the archaeological features identified at pre-construction phase and monitoring of topsoil stripping with the use of a metal detector at the construction phase, all in consultation with the Licensing Section of the National Monuments Service.	None
Effects to recorded monuments - none	No mitigation required.	None
Operational Effects		
Nearby Recorded Monuments and Protected Structures are screened from view.	No mitigation required.	None

4.10 MONITORING

The mitigation measures detailed above would also function as a monitoring system to allow the further assessment of the scale of the predicted impacts and the effectiveness of the mitigation measures.

4.11 REINSTATEMENT

The proposed development does not include a decommissioning or reinstatement phase. Therefore, reinstatement is not applicable to this assessment.

4.12 INTERACTIONS

There are interactions between this chapter and the landscape and visual chapter in view of the visual impacts on the settings of archaeological and cultural heritage sites and the potential for landscaping to mitigate such impacts, and with the water chapter and the drainage / SUDs design.

4.13 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION

No difficulties were encountered during the compilation of this chapter.

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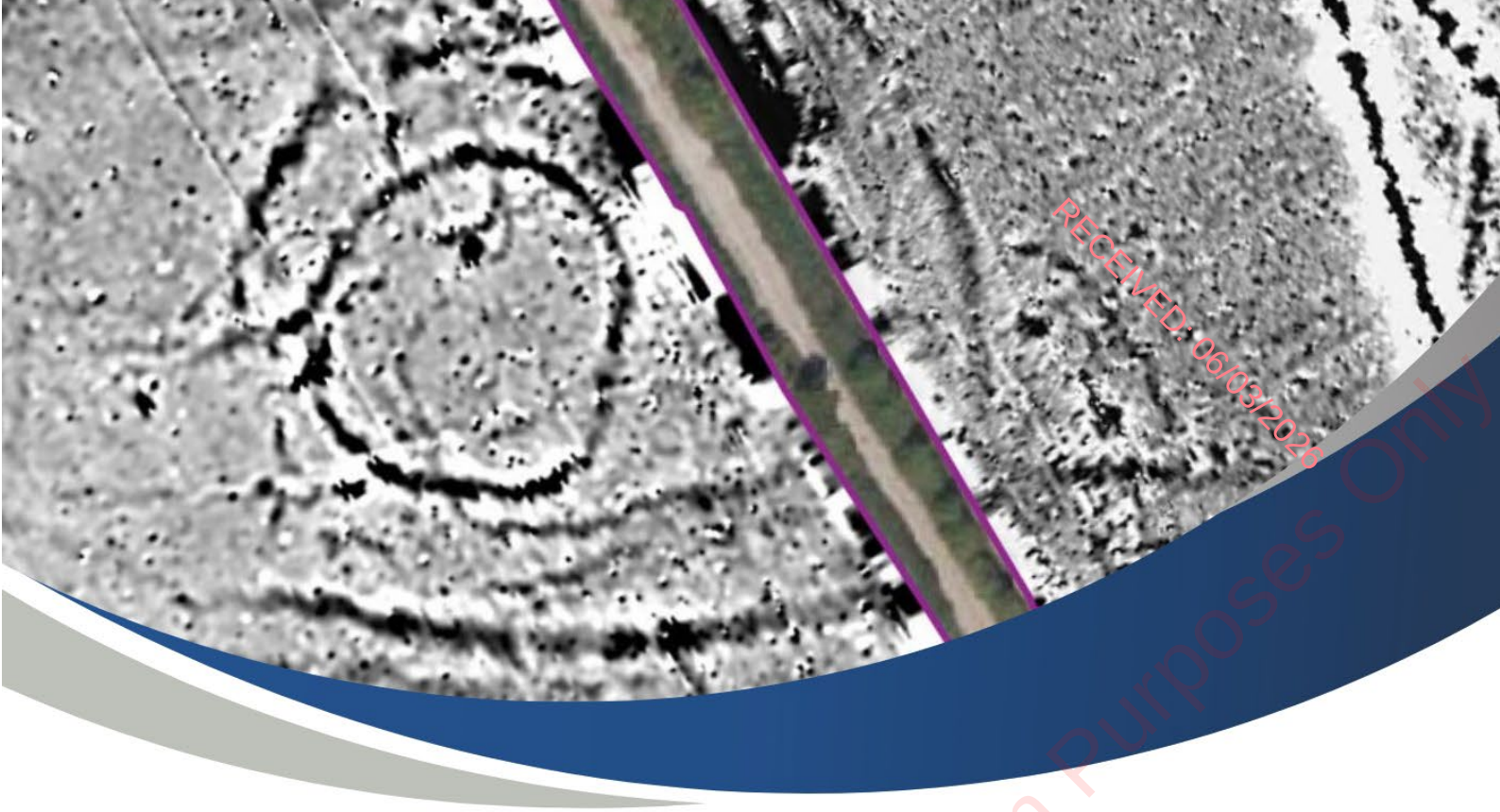
APPENDIX 4.1

GEOPHYSICAL SURVEY REPORT



Geophysical Survey Report
Railpark, Maynooth,
Co. Kildare

Detection Device Number: 24R0591

Donald Murphy
April 2025
Report Status: Final

ACSU Ref.: 24156

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PROJECT DETAILS

Project	Railpark, Maynooth, Co. Kildare
Report Type	Geophysical Survey Report
Licence No.	24R0591
Townland(s)	Railpark
RMP/SMR No.	N/A
RPS Id./NIAH Reg. No.	N/A
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Consultant	Archaeological Consultancy Services Unit, 21 Boyne Business Park, Greenhills, Drogheda, County Louth
Archaeologist	Donald Murphy
Report Author(s)	Donald Murphy
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VERSION CONTROL

Revision	Date	Description	Status	Author	Reviewed	Approved
1.0	28.04.2025	Geophysical survey results	Final	D.M & J.R	M.L	D.M

NON-TECHNICAL SUMMARY

This report details the results of a Geophysical Survey carried out at Railpark, Maynooth, Co. Kildare (ITM 694600, 737000). The site measured c. 16ha and consisted of two agricultural fields. The geophysical survey was carried out at the request of the client to assess the archaeological potential of the site in advance of a proposed Large-Scale Residential Development.

The site contains no monuments as listed in the *Record of Monuments and Places* (RMP) or the Sites and Monuments Record (SMR). Two such sites, a Burial Ground (KD010-040----) and a Furnace (KD011-061----), are recorded outside and 480m and 500m, respectively, to the south of the site. These were identified as a result of archaeological investigations (04E0644). The sites were previously unknown, with no surface expression. The site does not contain any Protected Structures, as listed in the *Kildare County Development Plan 2023–2029*, nor any structures listed in the *National Inventory of Architectural Heritage (NIAH)*.

Cartographic and aerial imagery were examined as part of this assessment. The site is continuously depicted as an agricultural field. By the time of the 2001–2005 aerial image, a broad strip traversing the site was visible, representing a service pipe, which was returned to pasture thereafter.

The geophysical survey was conducted by Donald Murphy, Robert Breen and Jeanne Rochford of Archaeological Consultancy Services Unit Ltd. (ACSU) under licence 24R0591 issued by the Department of Housing, Local Government and Heritage. A full, detailed gradiometer survey was undertaken throughout the application area using a SENSYS MAGNETO MXV3 8-sensor fluxgate gradiometer cart system.

Definite archaeological features were detected within the site, with more tentative responses recorded across the survey area. Two curvilinear anomalies that likely represent ring-ditches (**M1** & **M2**) were identified within the site. Scatters of other anomalies are also labelled as potential archaeology (?Archaeology). These include a curvilinear response and sporadic small responses that could represent archaeological features such as pits, postholes, spreads and kilns, but could also be of a natural origin.

Features depicted on the examined Ordnance Survey mapping were also detected, including numerous linear anomalies corresponding with former field boundaries. Linear anomalies that are not recorded field boundaries were also detected. They likely represent early field systems, drains or paths/access. Anomalies marked as Cultivation represent furrows/plough marks.

It is recommended that the anomalies identified be targeted during a future test trenching programme. This must be carried out by a licence-eligible archaeologist prior to any groundwork taking place. Once test trenching is complete, further mitigation might include preservation *in situ* (avoidance), excavation

(preservation by record), and/or monitoring. The Department of Housing, Local Government, and Heritage shall be consulted in this regard.

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1. INTRODUCTION

This report details the results of a Geophysical Survey carried out in the townland of Railpark, Maynooth, Co. Kildare (ITM 694600, 737000; Figures 1-2). The geophysical survey was requested in advance of the proposed development and carried out under Licence 24R0591. The site lies to the north of the M4 Motorway and south of the railway line and the Royal Canal, to the southeast of Maynooth town.

2. METHODOLOGY

A full, detailed gradiometer survey was undertaken throughout the application area using a SENSYS MAGNETO MXV3 8-sensor fluxgate gradiometer cart system mounted on a GPS-based non-magnetic cart system with four mounted sensors (see also Appendix 1). A detailed survey was conducted with a sample interval of 0.25m and a traverse interval of 1m for all the survey areas within the site, with variations in the magnetic field between -100nT to +107.834nT.

All work was carried out in accordance with the *IAI Code of Professional Conduct* (Institute of Archaeologists of Ireland 2006) and in accordance with the *EAC Guidelines for the Use of Geophysics in Archaeology* (Schmidt et al. 2016), as well as English Heritage's *Geophysical Survey in Archaeological Field Evaluation* (David et al. 2008).

3. SURVEY OBJECTIVES

The survey aimed to establish the presence of any potentially existing but previously unknown monuments and any other archaeological features within the site and to inform a future programme of test trenching.

4. SOILS, GEOLOGY AND TOPOGRAPHY

The survey area consisted of two agricultural fields measuring c. 16ha.

The site has an elevation of 64m Ordnance Datum (OD).

The underlying geology consists of massive, unbedded lime mudstone and is part of the Waulsortian Limestones Formation. This bedrock geology is overlaid by deep, well-drained mineral soils (Geological Survey Ireland).

5. ARCHAEOLOGICAL ASSESSMENT

5.1 Archaeological & Historical Background

The site is located southeast of Maynooth town centre, c. 20km to the west-northwest of Dublin City Centre. Maynooth town lies on the Lyreen River, a tributary of the River Rye. The site lies south of the Royal Canal and adjacent railway line, and north of the M4 motorway and Celbridge Road R405. The site is within Railpark townland, located within the Parish of Laraghbryan and the Barony of Salt North. Railpark (*Páirc an Ráille*) was recorded in 1744 as Rayld Park (https://www.logainm.ie/en/25437). In 1837, it was noted as formerly called Mill Farm, and the name Rail Parks was used from the late 18th century onwards.

No archaeological monuments are listed in the *Record of Monuments and Places* (RMP) nor in the *Sites and Monuments Record* (SMR) located within the townland of Railpark.

Maynooth

The town of Maynooth is located just inside the western edge of The Pale. The early Christian monastic centres of Laraghbryan (KD005-009001-), Taghadoe (KD010-014001-), and Donaghmore (KD006-005001-) are located within 2km of Maynooth town. Also, an early Christian burial ground (KD010-040----) was discovered in Moneycooly townland in 2004 (04E0644), located within the southeast part of the modern town. Burials of at least 55 individuals, almost all aligned east-west, were excavated (Duffy 2005).

The area of Maynooth was included in the diocese of Dublin sometime in the tenth century AD. This suggests that the area was somewhat organised and occupied before the arrival of the Anglo-Normans. This is also supported by the results of the excavations carried out in 1996 (96E0391) within the interior of Maynooth Castle. Hayden (1999) identified a prehistoric rectangular building (KD005-015001-) and two small post-and-wattle roundhouses (KD005-015002- and KD005-015003-) that pre-date the Anglo-Norman occupation. Furrows associated with the roundhouses were also excavated, suggesting agricultural activity in the immediate environs of the future castle site. A rectangular post-and-wattle building (KD005-015004-) was also excavated on top of the Anglo-Norman remains of a 1m-deep sod mound.

Following the arrival of the Anglo-Normans, documentary references to Maynooth can be easily traced. In 1176, Richard de Clare, the former earl of Pembroke (Strongbow), granted the lands at Maynooth 'Magnoded' to Maurice Fitzgerald (c 1110–76). As a result, the area became integrated as the manor of Maynooth with an Anglo-Norman landholding system (Horner 1995). Maynooth Castle (KD005-015----; National Monument No. 485) was likely built by his son, Gerald FitzMaurice FitzGerald (c.1150–1204), to mark the acquisition of the lands in Uí Fáeláin (Kildare). At this time, Maynooth was the centre of authority in the region, and one of the

earliest Anglo-Norman buildings in Ireland was erected. The construction likely started sometime just before 1180 and was completed by 1185, as suggested by O'Keeffe (2013), due to its similarities with the earliest phase of Trim's donjon; furthermore, it is also likely that it was built by the same mason. The original building had two floors, a basement, and a first floor. A settlement developed or grew around the castle. A chapel was part of the castle complex, likely since 1248. Edward I, in 1286, issued a patent for a weekly market and annual fair. In 1316, the FitzGeralds became the earls of Kildare, and Maynooth was their chief fortress. However, Maynooth did not stand out from other small manorial villages in the late medieval Dublin environs. In 1328, two mills are mentioned. In the late 15th/16th centuries, the power of the FitzGeralds was at its height as members of the family served as the king's lord deputy in Ireland between 1477 and 1534.

Lewis (1837) mentions that John, the sixth Earl of Kildare from the Kildare branch of the Fitzgerald family, erected a 'magnificent castle here in 1426'; he likely refers to the enlargement of the previously simple design of the donjon. During this time, the castle became 'one of the richest earl's houses under the crown of England' (Horner 1995). In 1515, the king granted a licence for the establishment of the College of the Blessed Virgin Mary of Maynooth. However, following the rebellion of Silken Thomas in 1535, the earl's estates were forfeited to the crown. Following the restoration of the estates in 1552 and the repair of the castle, little is known about Maynooth village in the second half of the 16th century. In the 1630s, Richard Boyle, Earl of Cork, one of the great entrepreneurs, enlarged the castle complex. He was a guardian to George Fitzgerald, who married his daughter. In 1642, however, the great library was destroyed, and the castle was left ruinous in 1647.

The Civil Survey of 1654–55 records a manor house in Maynooth, two corn mills, two malt houses, a chapel, two bridges, and several leases issued, suggesting a new tenant population.

In 1678, a patent for a weekly market and two annual fairs, references to the mill, a tan house, a new shop, slaughterhouse, a schoolhouse, and several buildings, suggest late seventeenth century Maynooth was a fast-growing village, likely due to its location on the main routes to the west of Dublin. In the late 1690s, a merchant, James McManus, was mentioned concerning Maynooth, and during this time, a rectory and an enclosed orchard off Parson Street were developed in the western part of the village. The 1730s saw Maynooth as a post-town with the Dublin-Kinnegad-Mullingar turnpike road constructed (Horner 1995).

In late 1739, the 19th Earl of Kildare decided to develop the house at nearby Carton as his principal country residence (KD006-009----). The Talbot family had erected the first Dutch-style building in Carton, which was recorded in a painting by Van der Hagen. Subsequently, the estate was forfeited to the Crown and, in 1703, sold to Major General Richard Ingoldsby, Lord Justice of Ireland. A two-storey, nine-bay pedimented front with wings was added. It was later sold to the 19th Earl of Kildare, who hired Richard Castle to enlarge the house.

Major work took place, and by the late 1740s, the house and the gardens were largely completed. A Charter School is now mentioned as being bounded on two sides by a road to Dunboyne and on a third by a straight, tree-lined avenue, representing Carton Avenue, that runs through the proposed development. It is described as extending for a kilometre from the gates at the east end of the main street to the new road, skirting the newly enlarged Carton Demesne. The avenue is on the same axis as the main street that dates to the 1750s (ibid.). In 1757, Rocque mapped Maynooth, giving insight into the organisation and the nature of plots within Maynooth village. He also depicts the current Carton Avenue.

Peter Bere, who was associated with the earl, held several leases on the main street in 1784. He and the earl were primarily responsible for the redevelopment of Maynooth. Evidence of a strategy to improve the village layout can be observed (Prunty and Clarke 2011). Street frontages were developed, including the square and green areas along each side of the main street. In the 1790s, a new axis at right angles to the main street and the construction of Williams Bridge allowed long-distance traffic to be finally diverted away from the castle. The Royal Canal was built to link Dublin and the Shannon and was routed south of Carton and Maynooth. In the western part of the village, a new Roman Catholic college – the Royal College of St Patrick – was established in Stoyte House, and additional buildings were constructed. This had a positive economic impact on the village, offering a source of local employment in addition to the demesne at Carton. The Roman Catholic lay college that opened in 1802 was short-lived and closed by 1820, and its properties were absorbed into St Patrick's College. With the population nearly doubled since the mid-18th century, it could now be described as a small town. In the 1830s, a Presentation convent was established in the eastern part of the town, on the site occupied by the charter school that had closed in 1819. This became the girls' national school, with a boys' school in the old chapel supported by the Duke of Leinster (Horner 1995).

In the 1820s, the strategy to improve Maynooth's layout, including the street framework, was nearly complete. This allowed the third duke to focus on improving the house and demesne at Carton. In 1819, the courthouse was built on the site of the former market house and shambles. In 1815, Richard Morrison was hired to remodel and enlarge Carton House for the Dukes of Leinster. During this time, the demesne of c. 1000 acres was landscaped.

In 1846, the castle area in Maynooth town was bought out and cleared of houses and cabins, and a garden was established here for the people of Maynooth. Only a few large houses can be noted at this time, e.g. a parochial house, a miller's house on Mill Street, and Crom-a-boo Lodge as part of the charter school site. Rows of houses were built at this time, fronting Charter School Lane, Parson Street, and later, in c. 1900, Dillion's Row of single-storey houses on Dunboyne Road. Several lanes in the town took their names from the

developer – e.g. Kelly's Lane from Clement Kelly's grocery shop, Cushin, Coates Lane, Coffey's Lane, and Doctor's Lane. In the 1850s, the most valued houses were mostly occupying both sides of Main Street.

A master plan for the town's future development was prepared by architect A.W. Pugin in the 1850s. As a result, St Mary's Square, the infirmary, chapel, the Aula Maxima (1894–5), and the great spire (1902) were constructed. The courthouse building was redeveloped to serve as a town hall with concert and meeting rooms.

The town's growth weakened, and in 1949, the Carton estate was sold. A large out-of-town housing scheme at Greenfield, on the south side of the canal and railway, was initiated in 1910. Main Street was tarred. With new water and sewerage schemes in the 1950s and the decision to admit lay students to the college, Maynooth was recognised as within the commuting range of an expanding Dublin, and the town grew rapidly. In 1981, the railway was reopened, and by 1994, the Leixlip-Kilcock motorway was built.

5.2 Previous Archaeological Investigations

The site was not subject to archaeological investigations previously. However, assessments in the environs were carried out, resulting in archaeological remains being exposed and excavated. These include two monuments now listed as a Burial Ground (KD010-040----) and a Furnace (KD011-061----), both located to the south of the site (Figure 2). These were identified as a result of archaeological investigations (04E0644; Duffy 2004). Furthermore, archaeological investigations to the south identified a ring ditch/barrow with a Bronze Age burial urn, cremation burial pits, as well as an early medieval cereal-drying kiln and five inhumation burials (19E0235; Gallagher 2019). The sites were previously unknown, with no surface expression. Test trenching on the site of Gaelscoil Uí Fhiaich, adjacent to the R405 Maynooth–Celbridge road to the south, exposed no features of archaeological significance (08E0575; O'Hara 2008). [Note: 05E0871 on Figure 2 has been located by the Database of Irish Excavation Reports in the incorrect location].

Listed below (Table 1) are the nearest previous archaeological investigations undertaken in the environs of the site (see Figure 2), which further demonstrate the overall archaeological potential of the site and its surrounding townlands. The following information was taken from the Database of Irish Excavation Reports (www.excavations.ie).

Table 1: Previous archaeological investigations within the environs of the site

Excavation.ie reference	Licence No.	Site-Type	Investigation Type
2004:0851 - Moneycooly, Maynooth, Kildare	04E0644	Burial ground and Furnace Early Medieval (AD 400–1099)	Testing Monitoring Excavation
2019:693 - Greenfield, Maynooth, Kildare	17R0009 19E0235	Ring-ditch/barrow, Bronze Age burial urn, early medieval cereal-drying kiln & inhumation burials	Geophysical Survey Testing Excavation
2008:670 - Gaelscoil Uí Fhiaich, Railpark, Maynooth, Kildare	08E0575	No archaeological significance	Testing

5.3 Recorded Monuments

The site contains no monuments as listed in the *Record of Monuments and Places* (RMP) or *the Sites and Monuments Record* (SMR). Two such sites, a Burial Ground (KD010-040----) and a Furnace (KD011-061----), are recorded outside and 480m and 500m, respectively, to the south of the site. As outlined in Section 5.2, these were identified as a result of archaeological investigations (04E0644; Duffy 2004).

Below (Table 2) is a list of monuments located within the environs of the site (Figure 2). These descriptions are derived from the National Monuments Service Archaeological Survey Database (https://heritagedata.maps.arcgis.com/apps/webappviewer/).

Table 2: Recorded Monuments in the environs of the site

KD010-040----	Burial ground	MONEYCOOLY
In 2004, in advance of the construction of a large housing estate, archaeological test trenching (Duffy C. Excavation Licence No. 04E0644) followed by monitoring of topsoil-stripping over the entire site resulted in the discovery and excavation of a previously unrecorded burial ground (KD010-040----) and, c. 100m to the ESE, two bowl furnaces (KD011-061----). The burials were on a very slight rise and were set out in six rows within a roughly sub rectangular area (14m E-W; 6.5m N-S), with two juvenile burials immediately to the north of the main group. The graves were simple unlined pits excavated through an upper, largely stone-free, subsoil into the surface of a lower stony clay subsoil that formed the base of the cuts. All but two were		

aligned east-west. There were occasional instances of small slabs laid at the side of the grave or overlying the interments. At least 55 individuals are represented among the burials, including disarticulated remains and skeletons disturbed by later grave-cuts. No artefacts were found with any of the burials, but the cemetery is most likely to date to the Early Christian period.

Six-Inch First edition: Not indicated

Six-Inch Latest edition: Not indicated

ITM Coordinates: 694439, 736275

Latitude and Longitude: 53.368221, -6.580947

KD011-061----	Furnace	MONEYCOOLY

In 2004, in advance of the construction of a large housing estate, archaeological test trenching (Duffy C. Excavation Licence No. 04E0644) followed by monitoring of topsoil-stripping over the entire site resulted in the discovery and excavation of two bowl furnaces (KD011-061----) and, c. 100m to the WNW, a small burial ground (KD010-040----). Two adjacent bowl furnaces, with diameters of 0.66m and 0.9m and depths of 0.37m and 0.45m, respectively, contained metal slag and charcoal. Nearby was a hearth, comprising a charcoal-rich deposit, 0.7m by 0.52m and 0.05m thick, over oxidised subsoil.

References: Duffy C. 2005 Preliminary Report on Archaeological Excavations at Moneycooly, Maynooth, Co. Kildare. Excavation licence No: 04E0644)

Six-Inch First edition: Not indicated

Six-Inch Latest edition: Not indicated

ITM Coordinates: 694532, 736230

Latitude and Longitude: 53.367800, -6.579563

5.4 Protected Structures and National Inventory of Architectural Heritage

The site does not contain any Protected Structures listed in the Kildare County Development Plan 2023–2029, nor any structures listed in the National Inventory of Architectural Heritage (NIAH). The nearest such structure is a Lime Kiln (B06-06), located c. 310m northeast of the site. Rockfield House, just southwest of the site, has been depicted since the 1835 map and is labelled on the 1908 map (Figures 3-4). However, it is not listed in the NIAH, and while it is visible on the 1995 aerial imagery, it was demolished by the time of the 1996–2006 aerial.

5.5 Finds listed within the Topographical Files of the National Museum of Ireland

The Topographical Files of the National Museum of Ireland list all archaeological artefacts in the care of or known to the museum. Such a record can provide evidence for human settlement or activity in the absence of physical remains or documentary references. There are no topographical files listed for the townland of Rail-park.

There are eleven finds listed for Maynooth. These include two stone axeheads (NMI Reg. No. 1945:259; 1967:101), a lead object (NMI Reg. No. 1995:2003), a bronze brooch (SA1925:8) and six copper alloy finds including four rings (NMI Reg. No. 1995: 2004-2007) a button (NMI Reg. No. 1995:2001) and a mount (NMI Reg. No. 1995:2002).

5.6 Cartographic Evidence

A review of available historical mapping for the area was carried out to include the Ordnance Survey (noe Táilte Éireann) of Ireland 6-inch (1835) and 25-inch (1908-09) maps (Figures 3-4), as well as pre-Ordnance Survey mapping that includes the Down Survey (1654–57), Keenan and Noble's map of county Kildare (1752) and Taylor's map of County Kildare (1783). Potential archaeological or cultural heritage features are often marked on such maps. They can provide a helpful resource in identifying sites, particularly if they no longer have any above-ground remains.

Pre-Ordnance Survey mapping examined does not give any detail in relation to the site. However, a road is shown traversing the site on the 1752 map.

The site is depicted as incorporating part of four agricultural fields on the 1836 OS map (Figure 3), with one of these field boundaries removed by the time of the 1908 OS map, which also depicts a spring abutting the northern boundary (Figure 4). This might suggest that this boundary of the site, depicted as a narrow strip on the 1836 map, was not a road/track but a wet ditch.

No archaeological features were recorded on the examined mapping; however, the line of the road depicted on the 1752 map may be considered historically significant if the mapping is accurate and an abandoned 18th-century road did once cross this field.

5.7 Aerial Photography

A review of available aerial photography for the area was also undertaken as part of this assessment. Aerial photographs dating between 1995 and 2018 from the Ordnance Survey of Ireland (OSi) were assessed, alongside Google Earth imagery dating between 2006 and 2023. Unrecorded archaeological sites can often be identified in aerial photographs as cropmarks or differential growth in a field, particularly during periods of drought, such as those experienced in the summer of 2018.

By the time of the 1995 aerial, further field boundaries had been removed, and on the 2001–2005/2006–2012 aerial images, a broad strip traversing the site roughly northwest to southeast was visible. It likely represents a service pipe. The area was returned to pasture thereafter, but the pipeline route is visible as a linear cropmark on subsequent aerial images (Figure 5).

No features of archaeological significance were recorded on the examined aerial imagery.

6. METHOD OF DATA INTERPRETATION

As outlined above, a detailed gradiometer survey that allows the detection of potential archaeological responses was conducted. The SENSYS MAGNETO MXV3 8-sensor fluxgate is a specifically designed gradiometer for use in archaeological prospection. Extremely sensitive, these instruments can detect variations in soil magnetism to 0.01nT, affording diverse applications throughout various archaeological, soil morphological and geological conditions. The survey was geo-referenced with a Trimble R10 unit accurate to within 1cm. The results were interpreted by examining the raw data as greyscale images, X.Y. trace, relief and data plots. Archived raw data is presented in Figure 6, and an interpretation is included in Figure 7.

7. SURVEY RESULTS

The geophysical survey was conducted in April 2025 by Donald Murphy, Robert Breen and Jeanne Rochford of ACSU under licence 24R0591 (Figures 6-7). The anomalies identified are listed in Table 3 below.

Table 3: Geophysical survey results

Anomaly No.	Form/Nature of Anomaly	Possible Source(s) of Anomaly	Description
M1	Archaeology	Ring-ditch	Small circular ring-ditch enclosure with a c. 7.5m diameter along the western portion of Field 1. The

Anomaly No.	Form/Nature of Anomaly	Possible Source(s) of Anomaly	Description
			anomaly is slightly fainter along its western side and appears to be truncated by cultivation furrows.
M2	?Archaeology	Possible ring-ditch	A faint positive curvilinear anomaly with a diameter of c. 8.5m. It lies c.40m south of the M1 ring-ditch. This feature likely represents another ring-ditch, but it has a weaker response than anomaly M1.
-	?Archaeology	Curvilinear	A positive curvilinear anomaly located directly southeast of M2 may represent the partial remains of a ring-ditch but is disturbed by the buried service to the east.
-	?Archaeology	Small to medium anomalies: pits, posts, spreads, kilns, cut features	A series of positive anomalies occur sporadically across the survey area. These might represent cut features such as pits, postholes, spreads, kilns, or other types of archaeological features. It may also be natural in origin.
-	Linear feature	Former field boundaries	Positive linear anomalies that correspond with former field boundaries depicted on the first edition Ordnance Survey (OS) 6-inch map, surveyed 1835, and the third edition Ordnance Survey (OS) 25-inch map, surveyed 1908, are located within Fields 1 & 2.
-	Linear feature	Early field systems?	Positive linear anomalies in Fields 1 and 2 may represent former field divisions that are not depicted on OS mapping.
-	Magnetic disturbance	Modern disturbance	Magnetic disturbance in the western portion of Field 1 corresponds with modern disturbance in the area from environmental trial pits.
-	Buried service	Modern service	A bipolar response traversing Field 1 corresponds with the laying of a modern service that can be seen in aerial imagery from 2001-2005.
-	Cultivation	Land use/furrows	A series of cultivation furrows occurred in Field 1, predominantly in the southern portion of the field.
-	Ferrous	Magnetic disturbance from modern debris	Bipolar anomalies sporadically occur that are associated with magnetic interference from modern

Anomaly No.	Form/Nature of Anomaly	Possible Source(s) of Anomaly	Description
			ferrous material, either in the topsoil or the surface of the survey area.

8. IMPACT ASSESSMENT

The purpose of this impact assessment was to establish whether or not the site contained any evidence for the presence of previously unrecorded areas or features of historical, built heritage or archaeological significance and to determine the potential impacts the proposed development may have on all archaeological features.

The geophysical survey was carried out in April 2025 under Licence 24R0591. This survey identified definite archaeological features that include two curvilinear features that likely represent ring-ditches (**M1** & **M2**), with a further curvilinear feature that may represent the partial remains of a ring-ditch or slot trench, while scatters of other anomalies also represent potential archaeology (?Archaeology).

If not adequately mitigated, the proposed development of this site, therefore, has the potential to impact definite archaeological features as well as features of archaeological potential identified within the site.

9. CONCLUSIONS & RECOMMENDATIONS

The geophysical survey within the townland of Railpark, Maynooth, Co. Kildare (ITM 694600, 737000) was carried out to assess the site's archaeological potential.

Definite archaeological features were detected within the site, with more tentative responses recorded across the survey area that may have a natural origin. Two curvilinear anomalies that likely represent ring-ditches (**M1** & **M2**) were identified within the site. Scatters of other anomalies are also labelled as potential archaeology (?Archaeology). These include a curvilinear response and sporadic small responses that could represent archaeological features such as pits, postholes, spreads and kilns, but could also be of a natural origin.

Features depicted on the examined Ordnance Survey mapping were also detected, including numerous linear anomalies corresponding with former field boundaries. Linear anomalies that are not recorded field boundaries were also detected. They likely represent early field systems, drains or paths/access. Anomalies marked as Cultivation represent furrows/plough marks.

It is recommended that:

- Anomalies identified are targeted during a test trenching programme, particularly the ring-ditches, curvilinear features, pits, spreads and any features of archaeological significance and potential. Following the test trenching, the National Monuments Service should be consulted to agree on an appropriate mitigation strategy for the development of the site.
- If preservation *in situ* is not an option in some areas and any archaeological features will be directly impacted by the proposed development, preservation by record (full excavation) is recommended.

All further groundworks within the proposed development site should also be monitored, and any further archaeological features identified should be preserved *in situ* or by record (excavation) in consultation with the National Monuments Service.

10. REFERENCES

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11. APPENDIX 1 – SUMMARY TECHNICAL INFORMATION & GLOSSARY OF TERMS

Fluxgate Gradiometer Survey is a non-intrusive method of archaeological prospection that is most often used in Irish Archaeology. This method allows for rapidly mapping archaeological objects, structures, deposits and other features, including geological anomalies, that survive beneath the ground. It allows the most rapid ground coverage and records a variety of anomalies caused by human activity and changes in the natural subsoil. The results are presented as a greyscale map of anomalies detected that are interpreted by an experienced archaeologist.

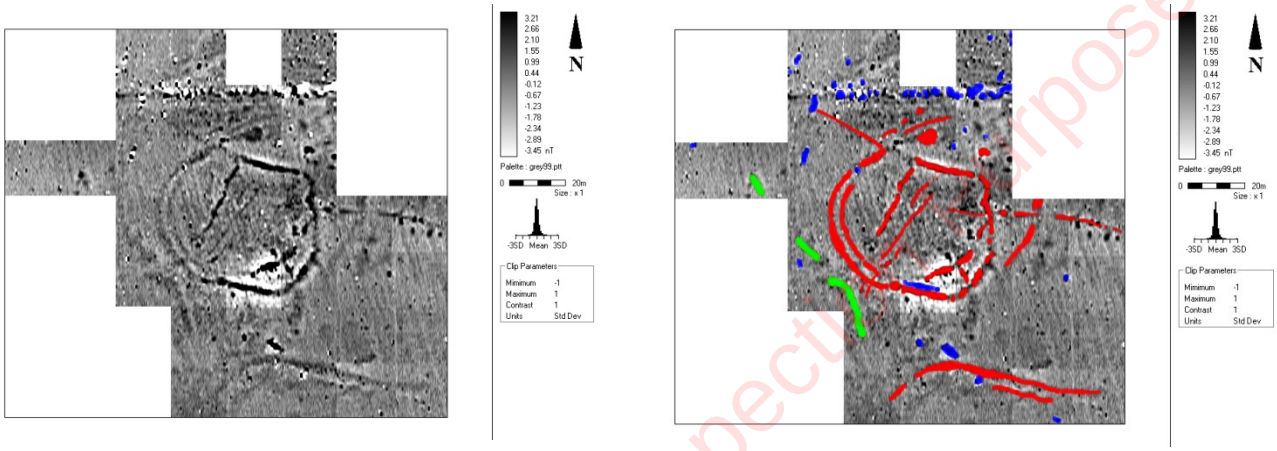
Surveys are undertaken using GPS-based lightweight B SENSYS MAGNETO MXV3 8-sensor fluxgate gradiometer cart system. Ground cover must be 0.30m or less. The instrument used is operated by an experienced, skilled geophysical survey technician. The data is collected by hand-wheeling the cart over the survey area in evenly spaced parallel transects. The equipment was specifically designed for archaeological prospection. It includes highly stable sensors, minimising requirements for excess data processing. The instrument has a vertical 1 m sensor separation permitting finite resolution of buried archaeological features. Surveys can be undertaken in a scan or detailed (zig-zag traverse) modes for reconnaissance or high-density mapping. The fluxgate enables reliable flexibility during fieldwork. Regular realignment of the instruments and zero drift correction ensure constant high data quality. These extremely sensitive instruments can detect variations in soil magnetism to 0.01nT, affording diverse applications throughout a variety of archaeological, soil morphological and geological conditions.

The instrument can be employed in both commercial and research-based investigations allowing for the completion of projects within short timescales. Regular grid sample densities from standard 1600 readings to 12800 readings per 20m by 20m grid are permitted. A constant high quality of data is assured by experienced field staff operating in accordance with E*AC Guidelines for the use of Geophysics in Archaeology* (Schmidt et al. 2015) and English Heritage's *Geophysical Survey In Archaeological Field Evaluation* (David et al. 2008).

SENSYS MAGNETO MXV3 8-sensor fluxgate gradiometer cart system

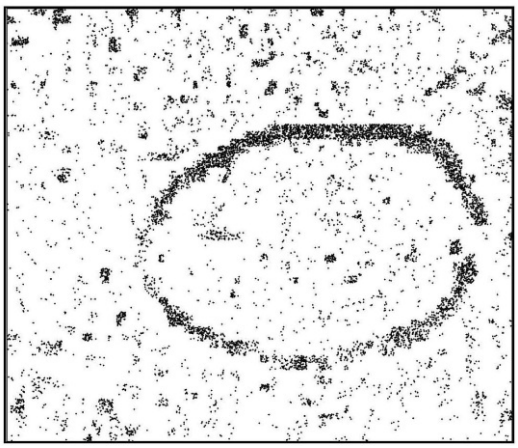
Data Display Format

Greyscale: The greyscale format assigns a cell to each datum according to its location on the grid. The display of each data point is conducted at very fine increments, allowing the full range of values to be displayed within the given data set. This display method also enables the identification of discrete responses that may be at the limits of instrument detection.

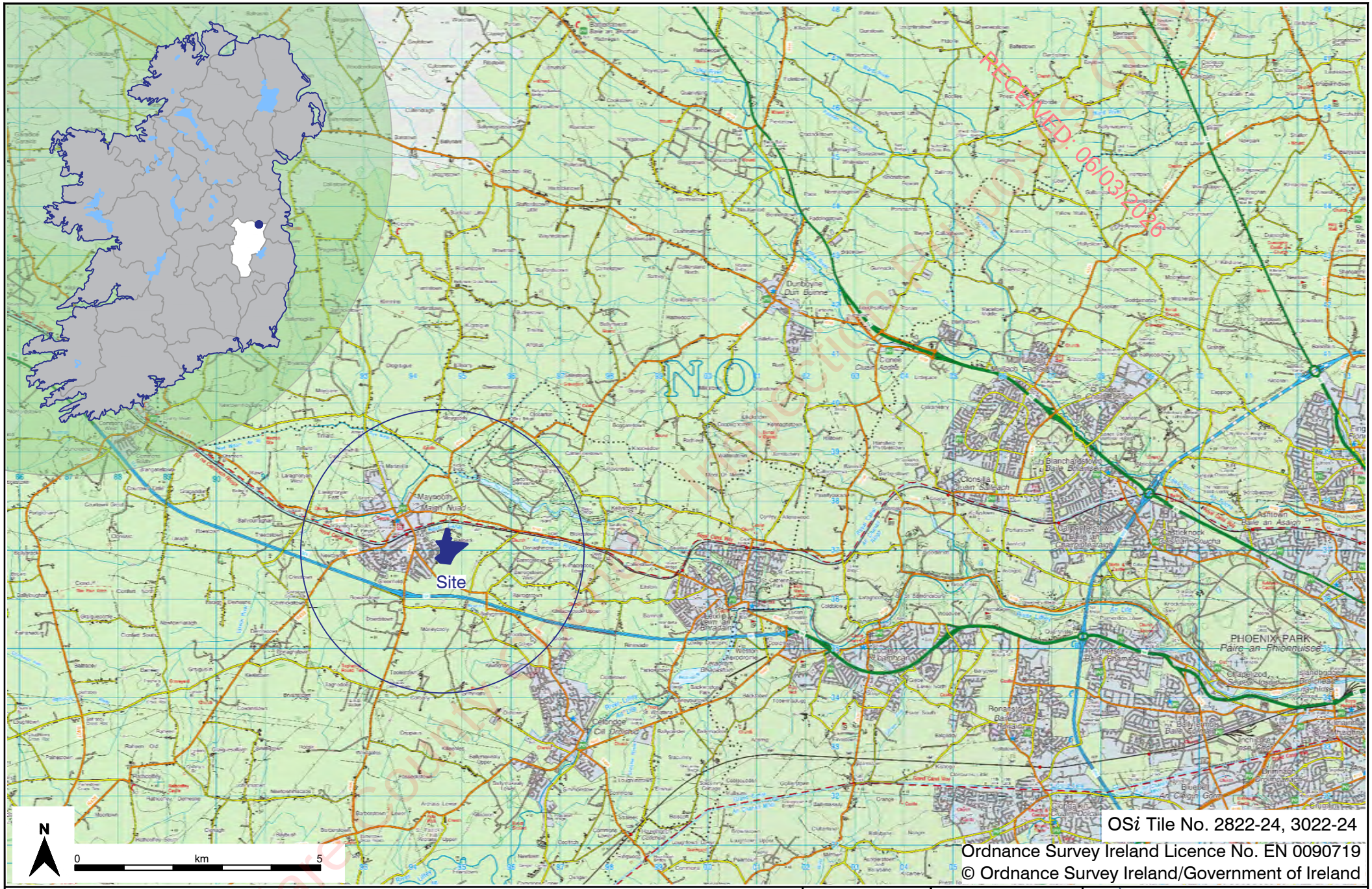


Early medieval enclosure – greyscale

Dot Density Plot: Each datum is assigned a cell in which the intensity or number of dots displayed is proportional to the magnitude of the individual response. The visibility or presentation of responses within a given survey area is governed by numeric parameters specific to both soil morphological and archaeological conditions observed on site. Typically, the range of weak to strong responses is manifested by a low to a high level of dot density. The format is useful for displaying gradiometer and resistance data, particularly for identifying low-level responses.



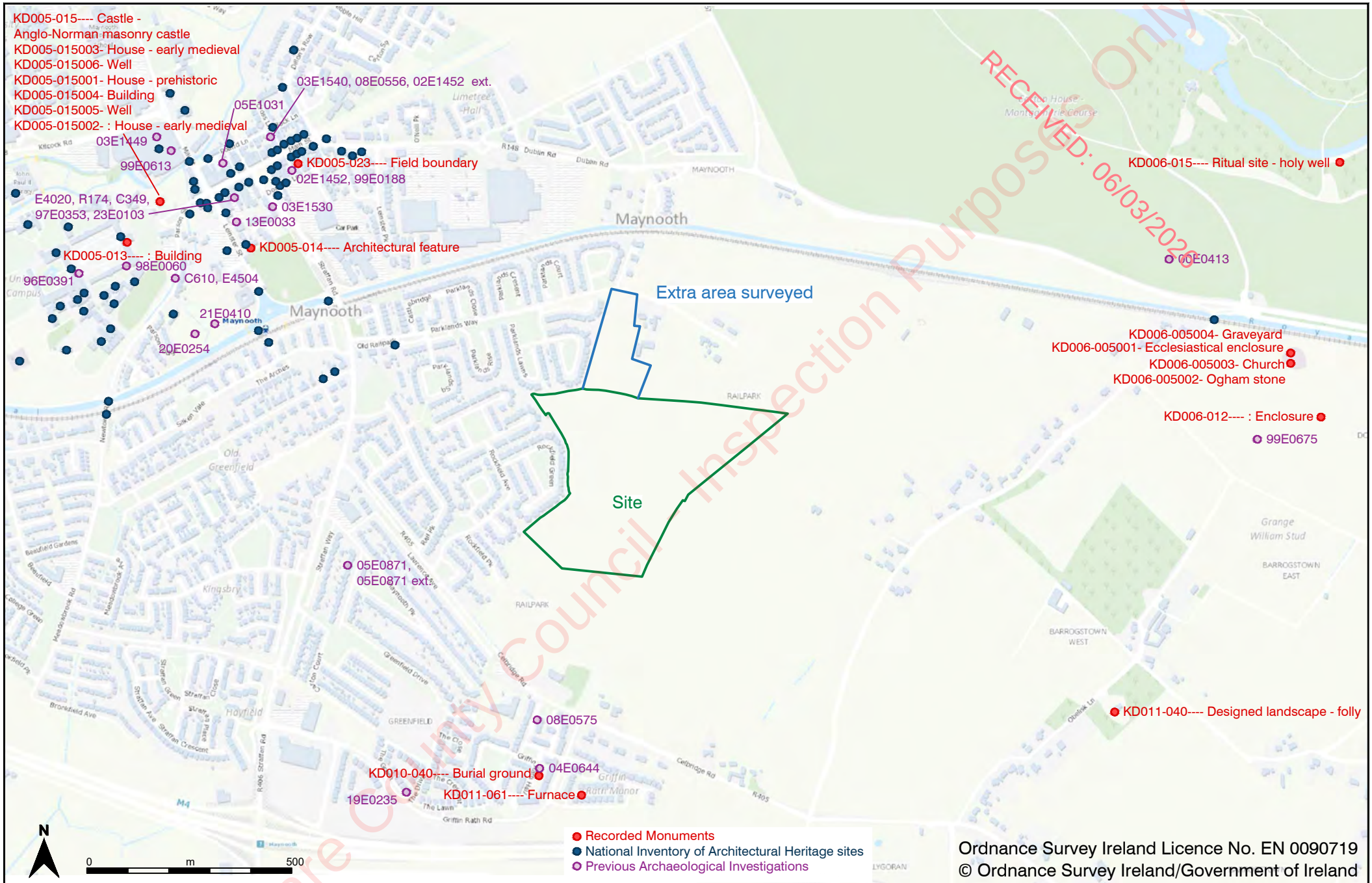
Dot Density plot of an oval-shaped enclosure



OS*i* Tile No. 2822-24, 3022-24

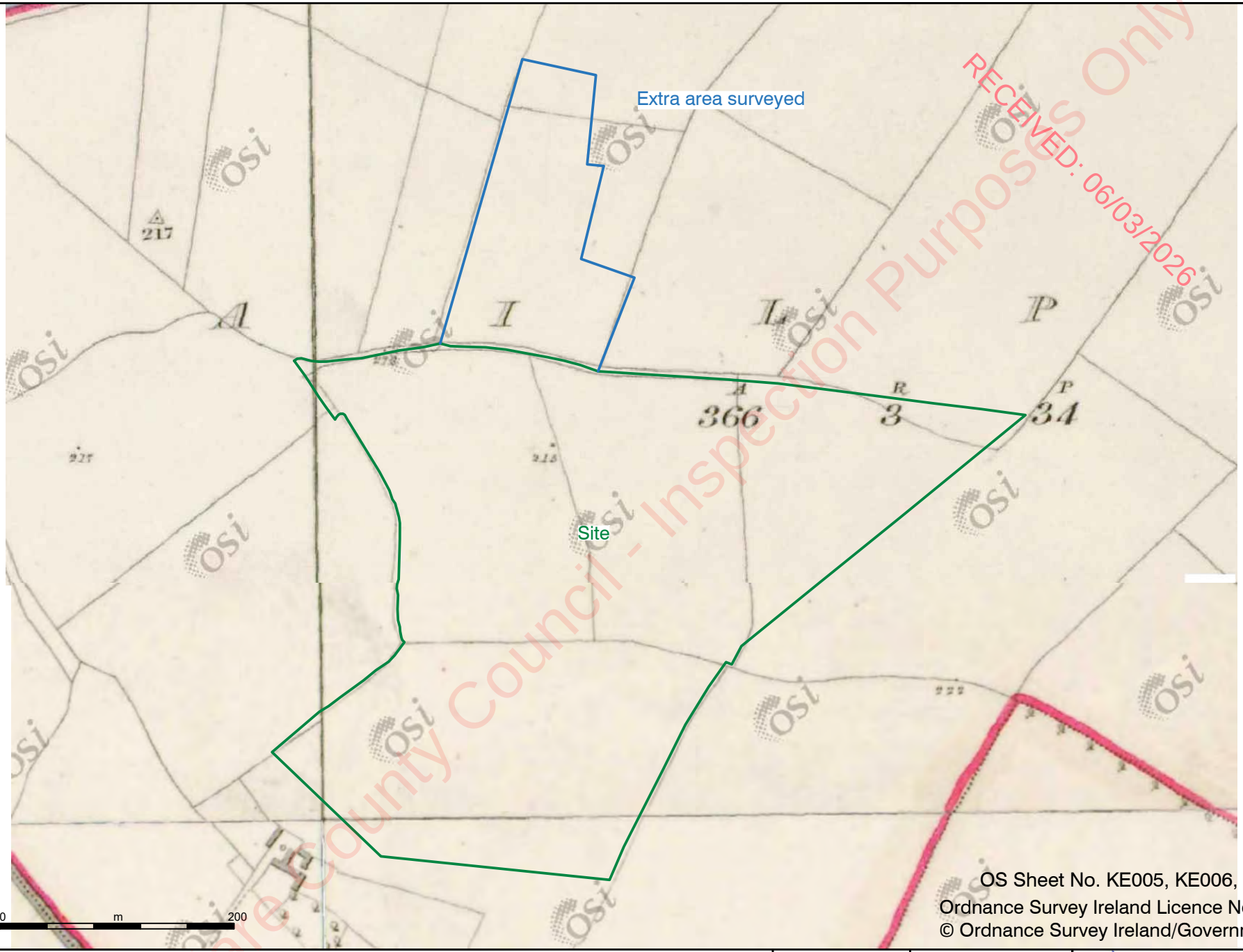
Project Railpark, Maynooth, Co. Kildare		**Date** April 2025	**Drawing No.** 24156_C1001
Figure 1 Location of site			**Scale** 1:100,000 @ A4

ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT



Project Railpark, Maynooth, Co. Kildare		**Date** April 2025	**Drawing No.** 24156_C1002
Figure 2 Location of site, previous archaeological investigations and nearby *Sites and Monuments Record* sites			**Scale** 1:12,000 @ A4

ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT



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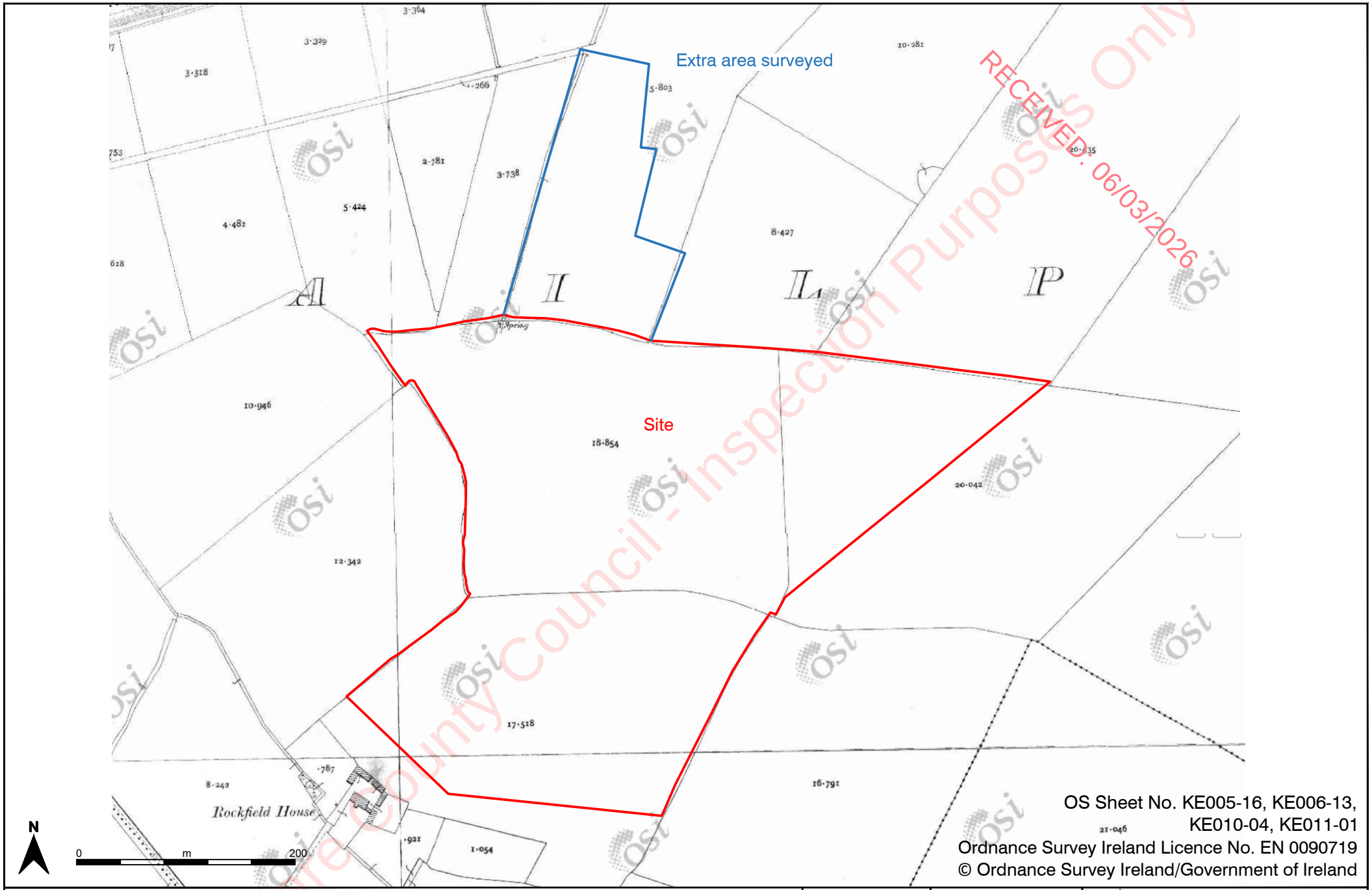
Project Railpark, Maynooth, Co. Kildare	**Date** April 2025	**Drawing No.** 24156_C1003	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 3 Extract from 1st edition Ordnance Survey (OS) 6-inch map (surveyed 1835 - published 1837), showing location of site		**Scale** 1:4,500 @ A4	



OS Sheet No. KE005-16, KE006-13, KE010-04, KE011-01
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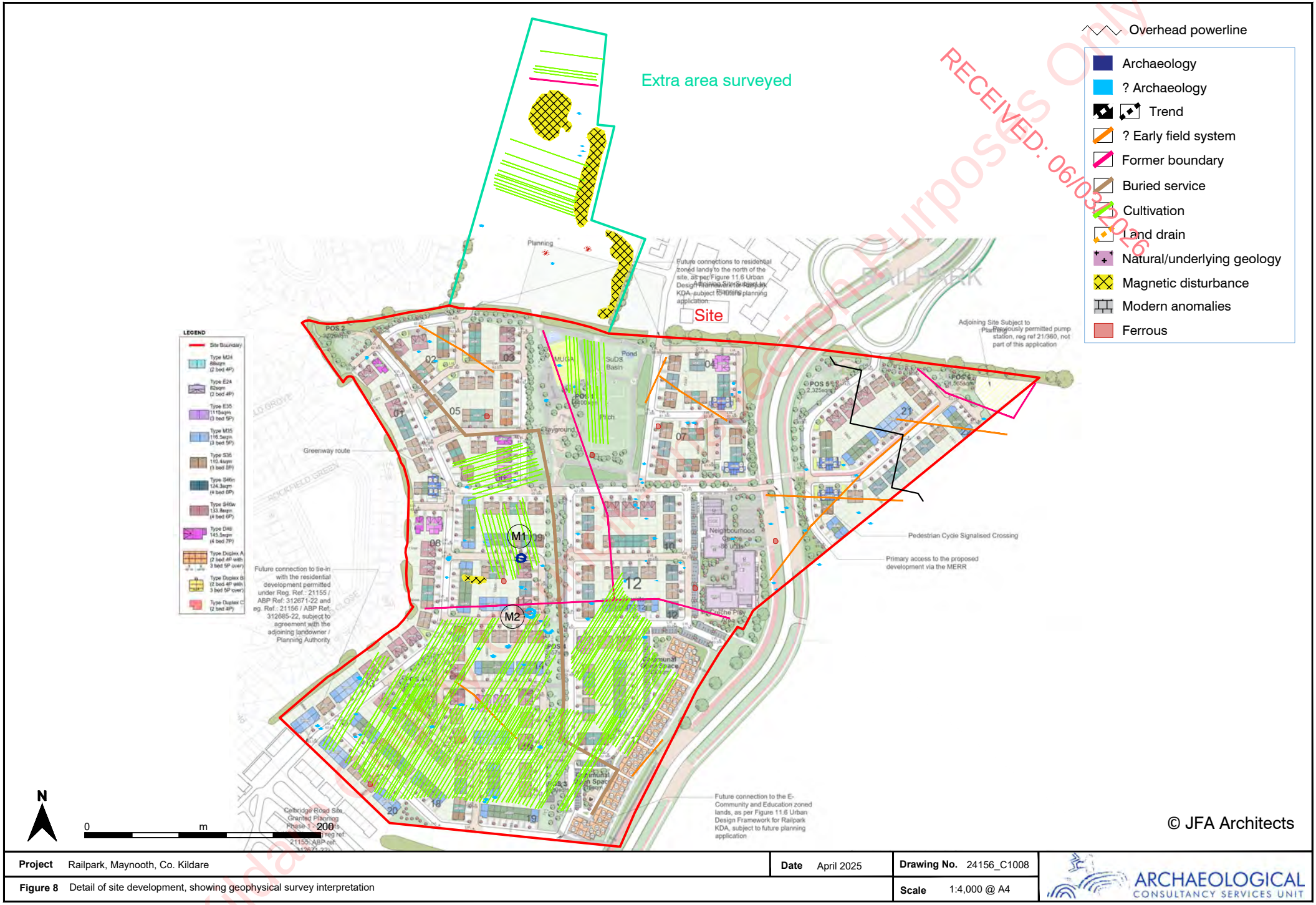
Project Railpark, Maynooth, Co. Kildare		**Date** April 2025	**Drawing No.** 24156_C1004
Figure 4 Extract from 3rd edition Ordnance Survey (OS) 25-inch map (surveyed 1908-09 - published 1910), showing location of site			**Scale** 1:4,500 @ A4

ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT

Project Railpark, Maynooth, Co. Kildare	**Date** April 2025	**Drawing No.** 24156_C1005	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 5 Aerial view of site		**Scale** 1:4,000 @ A4	

Project Railpark, Maynooth, Co. Kildare	**Date** April 2025	**Drawing No.** 24156_C1006	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 6 Aerial view of site, showing geophysical survey results (greyscale images)		**Scale** 1:4,000 @ A4	

Project Railpark, Maynooth, Co. Kildare	**Date** April 2025	**Drawing No.** 24156_C1007	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 7 Aerial view of site, showing geophysical survey interpretation		**Scale** 1:4,000 @ A4	



Project Railpark, Maynooth, Co. Kildare		**Date** April 2025	**Drawing No.** 24156_C1008
Figure 8 Detail of site development, showing geophysical survey interpretation			**Scale** 1:4,000 @ A4

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APPENDIX 4.2

TEST EXCAVATION REPORT

Archaeological Impact Assessment: Test Excavation Report Railpark, Maynooth, Co. Kildare

Part 1 – Archaeological Information

Licence Number: 25E0711

Ian Russell
January 2026
Report Status: Final

ACSU Ref.: 24156

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PROJECT DETAILS

Project	Largescale Residential Development at Railpark, Maynooth, Co. Kildare
Report Type	Archaeological Test Excavation
Licence No.	25E0711
Detection Device Licence No.	24R0591
Townland(s)	Railpark
RMP/SMR No.	N/A
RPS Id./NIAH Reg. No.	N/A
ITM Ref.	694600, 737000
Consultant	Archaeological Consultancy Services Unit, 21 Boyne Business Park, Greenhills, Drogheda, County Louth
Archaeologist	Ian Russell
Report Author(s)	Ian Russell and Mark Louth
Report Status	Final
Report Date	January 2026
ACSU Ref.	24156

VERSION CONTROL

Revision	Date	Description	Status	Author	Reviewed	Approved
1.0	19.01.2025	Archaeological test excavation report		I.R. M.L.	K.C.	D.M.

NON-TECHNICAL SUMMARY

This report details the results of test excavations carried out at Railpark, Maynooth, Co. Kildare (ITM 694600, 737000). The site covers c. 16ha and consists of two agricultural fields. The test excavations were carried out over the course of a week in early January 2026 to assess the archaeological potential of the site in advance of a Large-Scale Residential Development. The northern portion of the site (extra area) is outside the site boundary and may be subject to test excavations in the future.

The site was previously subject to a geophysical survey (24R0591; Murphy 2025). Definite archaeological features were detected within the site, with more tentative responses recorded across the survey area. Two curvilinear anomalies that likely represent ring-ditches (M1 & M2) were identified. Scatters of other anomalies were also labelled as potential archaeology. These include a curvilinear response and sporadic small responses that could represent archaeological features such as pits, postholes, spreads and kilns, but could also be of a natural origin. Features depicted on the examined Ordnance Survey mapping were also detected, including numerous linear anomalies corresponding with former field boundaries. Linear anomalies that are not recorded field boundaries were also detected. They likely represent early field systems, drains or paths/access. Anomalies marked as Cultivation represent furrows/plough marks.

The site contains no monuments listed in the *Record of Monuments and Places* (RMP) or the *Sites and Monuments Record* (SMR). Two such sites, a Burial Ground (KD010-040----) and a Furnace (KD011-061----), are recorded outside and 480m and 500m, respectively, to the south of the site. These were identified as a result of archaeological investigations (04E0644). The sites were previously unknown, with no surface expression. The site does not contain any Protected Structures, as listed in the *Kildare County Development Plan 2023–2029*, nor any structures listed in the *National Inventory of Architectural Heritage* (NIAH). Cartographic and aerial imagery were examined, with the site depicted as agricultural fields since the early 19th century. By the time of the 2001–2005 aerial image, a wide strip traversing the site was visible, representing a service pipe, which was returned to pasture thereafter.

Archaeological testing was carried out by Ian Russell under excavation licence 25E0711, issued by the Department of Housing, Local Government and Heritage, in consultation with the National Museum of Ireland. A total of 61 test trenches were proposed within the current site and 51 trenches were excavated down to natural or the surface of archaeological remains. Trenches 11–17, 23 and 73 in the northeast of the site were unfeasible as this area was undergoing construction for the Maynooth Eastern Relief Road (MERR) and being used temporarily for topsoil storage. Trench 56 could also not be excavated due to the presence of a modern sewer line. The topsoil (C1) across the site ranged from a mid-brown clayey silt to a dark brown silty clay and measured between 0.30m and 1.00m in thickness. The natural (C2) was a stony, orange-brown boulder clay with stony grey subsoil. Features of archaeological significance were identified in Trenches 43, 45 and 53.

A circular ring-ditch, identified as dark brown clay and charcoal (C4301), was found in the north end of Trench 43. This was also identified in the previous geophysical survey, immediately southeast of M2 (24R0591; Murphy 2025). The ditch measures c. 1m in width it has an internal diameter of c. 4.50m.

A possible masonry structure (C4501) was identified at the west end of Trench 45. The feature is circular in plan and constructed with stone and lime mortar, with an interior fill of grey clay and lime mortar. It likely represents the remains of an 18th/19th-century lime kiln.

The northeast end of Trench 53 was extended to the northwest and southeast to examine the horizontal extent of the archaeological remains exposed there, with four human inhumation burials, a ring-ditch with a possible extension and a second possible ring-ditch identified in this area. Burial 1 (C5303) consists of the outline of a possible grave cut filled with dark clay, identified within a ring-ditch (C5302). The ring-ditch is represented by a fine orange-brown clay, has a ditch measuring c. 0.80–1.10m in width and is 6m in internal diameter. A north–south extension cut (C5304) filled with a similar orange-brown clay was identified to the north of this ring-ditch, stopping just short of Burial 2. Burial 2 (C5305) is aligned east–west and filled with a dark brown clay. Burial 3 (C5306) is to the immediate east of Burial 2 and extended under the east baulk of the extension to Trench 53. The grave cut was filled with a dark brown clay with human bone evident in the fill. Burial 4 (C5307) was identified to the immediate west of Burials 2 and 3, and is filled with a dark brown clay with human bone. A curvilinear feature (C5301), perhaps representing another ring-ditch, was also found in Trench 53, to the southwest of ring-ditch C5302. This feature is circular in plan and extended southwards from the baulk of the trench. It is represented by a brown clay with frequent charcoal, with a ditch that measures c. 0.60m in width and has an internal diameter of c. 1.50m.

Due to the significance of the features found in Trenches 43, 45, and 53, the proposed development will have an impact on the archaeology in these parts of the site. Therefore, it is recommended that these features be investigated and persevered by record (fully excavated by hand) before any further works are carried out in these areas of the site. It is also recommended that any topsoil stripping of the site is monitored by an archaeologist, including the northeast area (east of the MERR) that was not accessible during these test excavations. Both excavation and monitoring must be carried out by a suitably qualified archaeologist working under licence from the Department of Housing, Local Government and Heritage. Archaeological material identified during monitoring may necessitate further mitigation, including preservation in situ (avoidance) or preservation by record (excavation) following consultation with the National Monuments Service.

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1. INTRODUCTION

This report details the results of test excavations carried out at Railpark, Maynooth, Co. Kildare (ITM 694600, 737000; Figures 1–2). The site covers c. 16ha and consists of two agricultural fields (Figure 5). The test excavations were carried out over the course of a week in early January 2026 to assess the archaeological potential of the site in advance of a Large-Scale Residential Development. The northern portion of the site (extra area) is outside the site boundary and may be subject to test excavations in the future.

The site was previously subject to a geophysical survey (24R0591; Murphy 2025). Definite archaeological features were detected within the site, with more tentative responses recorded across the survey area (Figures 6–7). Two curvilinear anomalies that likely represent ring-ditches (M1 & M2) were identified within the site. Scatters of other anomalies are also labelled as potential archaeology. These include a curvilinear response and sporadic small responses that could represent archaeological features such as pits, postholes, spreads and kilns, but could also be of a natural origin. Features depicted on the examined Ordnance Survey mapping were also detected, including numerous linear anomalies corresponding with former field boundaries. Linear anomalies that are not recorded field boundaries were also detected. They likely represent early field systems, drains or paths/access. Anomalies marked as Cultivation represent furrows/plough marks. Based on the geophysical survey results, test trenching was recommended.

The site contains no monuments listed in the *Record of Monuments and Places* (RMP) or the *Sites and Monuments Record* (SMR). Two such sites, a Burial Ground (KD010-040----) and a Furnace (KD011-061----), are recorded outside and 480m and 500m, respectively, to the south of the site (Section 3.3; Figure 2). These were identified as a result of archaeological investigations (04E0644; Section 3.2). The sites were previously unknown, with no surface expression. The site does not contain any Protected Structures, as listed in the *Kildare County Development Plan 2023–2029*, nor any structures listed in the *National Inventory of Architectural Heritage* (NIAH) (Figure 2). Cartographic and aerial imagery were examined, with the site depicted as agricultural fields since the early 19th century (Sections 3.6 and 3.7; Figures 3–5). By the time of the 2001–2005 aerial image, a wide strip traversing the site was visible, representing a service pipe, which was returned to pasture thereafter.

Archaeological testing was carried out by Ian Russell under excavation licence 25E0711, issued by the Department of Housing, Local Government and Heritage, in consultation with the National Museum of Ireland.

1.1 Project Background

The site is located in the townland of Railpark to the southeast of Maynooth town in Co. Kildare. It comprises two grassed fields to the north of the M4 Motorway and south of the railway line and the Royal Canal.

The proposed Large-Scale Residential Development (Planning Ref. LRD 2561119) consists of 581 no. residential units, a neighbourhood centre and all associated developments, on a site of approximately 15.98 hectares. The residential component of the development consists of 166 no. apartment/duplex units and 415 no. houses to be provided as follows:

- 61 no. 2 bed two storey terraced houses;
- 58 no. 3 bed two storey terraced houses;
- 91 no. 3 bed two storey end terrace houses semi-detached houses;
- 138 no. 3 bed two storey semi-detached houses;
- 64 no. 4 bed two storey semi-detached houses;
- 3 no. 4 bed two storey detached houses;
- 166 no. duplex apartments / apartments (50 no. 1 beds, 88 no. 2 beds and 28 no. 3 beds) in a series of 3 to 4 storey duplex apartment / apartment blocks;
- All duplex apartments / apartment units to have balcony, terrace or private garden.

The neighbourhood centre is in two 5 storey blocks around a public plaza area and includes a childcare facility (732 sq.m), café (166 sq.m), medical centre (259 sq.m), pharmacy/shop (134 sq.m) and a convenience shop (106 sq.m). 74 no. apartments and 12 no. own door duplex units are provided from ground to fourth floor level of the neighbourhood centre.

A total of 888 no. car parking spaces are proposed, which includes 711 no. in-curtilage spaces for houses, 115 no. spaces for the duplex apartments / apartments, 14 no. for the commercial uses at the neighbourhood centre, 12 no. spaces for the staff of the childcare facility and 36 no. visitor spaces for residents. A total of 606 no. cycle spaces are proposed for residents, 40 no. spaces for the neighbourhood centre uses and 83 no. visitor cycle parking spaces.

The proposal includes hard and soft landscaping, lighting, boundary treatments, communal open space, 2.72 ha of public open space including a Local Park and Pocket Parks, children's play areas and an and an ancillary play area for the childcare facility.

The proposed development provides for access from the permitted Maynooth Eastern Ring Road (MERR), including a new pedestrian/cyclist signalised crossing, associated internal roads, pedestrian and cycle paths and access points provided up to the application site boundary to provide for potential future connections to adjoining lands to the north and south, subject to agreement with the Planning Authority / adjacent landowner.

Test trenching as part of a Further Information Request was recommended by the Department of Housing, Local Government and Heritage.

2. SOILS, GEOLOGY AND TOPOGRAPHY

The site consists of two agricultural fields and it has an elevation of 64m Ordnance Datum (OD). The underlying geology consists of massive, unbedded lime mudstone and is part of the Waulsortian Limestones Formation (Geological Survey Ireland). This bedrock geology is overlaid by deep, well-drained mineral soils (Teagasc Soil Information System).

3. ARCHAEOLOGICAL ASSESSMENT

3.1 Archaeological & Historical Background

The site is located to the southeast of Maynooth town centre, c. 20km to the west-northwest of Dublin City Centre. Maynooth town lies on the Lyreen River which is a tributary of the River Rye. The site is to the south of the Royal Canal and adjacent railway line, and north of the M4 motorway and Celbridge Road R405. The site is fully within Railpark townland, located within the Parish of Laraghbryan and the Barony of Salt North. Railpark (*Páirc an Ráille*) was recorded in 1744 as Rayld Park (https://www.logainm.ie/en/25437). In 1837 it was noted as formerly called Mill Farm, with the name Rail Parks used from the late 18th century onwards.

There are no archaeological monuments listed in the *Record of Monuments and Places* (RMP) nor in the *Sites and Monuments Record* (SMR) located within the townland of Railpark.

Maynooth

The town of Maynooth is located just inside the western edge of The Pale. The early medieval monastic centres of Laraghbryan (KD005-009001-), Taghadoe (KD010-014001-), and Donaghmore (KD006-005001-) are located within 2km of Maynooth town. Also, an early medieval burial ground (KD010-040----) was discovered in

Moneycooly townland in 2004 (04E0644), located within the southeast part of the modern town. Burials of at least 55 individuals, almost all aligned east–west, were excavated (Duffy 2005).

The area of Maynooth was included in the diocese of Dublin sometime in the tenth century AD. This suggests that the area was somewhat organised and occupied before the arrival of the Anglo-Normans. This is also supported by the results of the excavations carried out in 1996 (96E0391) within the interior of Maynooth Castle. Hayden (1999) identified a prehistoric rectangular building (KD005-015001-); and two small post-and-wattle roundhouses (KD005-015002- and KD005-015003-) that pre-date the Anglo-Norman occupation. Furrows associated with the roundhouses were also excavated, suggesting agricultural activity in the immediate environs of the future castle site. A rectangular post-and wattle building (KD005-015004-) was also excavated on top of the Anglo-Norman remains of a 1m-deep sod mound.

Following the arrival of the Anglo-Normans, documentary references to Maynooth can be easily traced. In 1176, Richard de Clare, the former earl of Pembroke (Strongbow), granted the lands at Maynooth 'Magnoded' to Maurice Fitzgerald (c 1110–76). As a result, the area became integrated as the manor of Maynooth with an Anglo-Norman landholding system (Horner 1995). Maynooth Castle (KD005-015----; National Monument No. 485) was likely built by his son, Gerald FitzMaurice FitzGerald (c.1150–1204) to mark the acquisition of the lands in Uí Fáeláin (Kildare). Maynooth was at this time the centre of authority in the region and became the place where one of the earliest Anglo-Norman buildings in Ireland was erected. The construction likely started sometime just before 1180 and was completed by 1185, as suggested by O'Keeffe (2013), due to its similarities with the earliest phase of Trim's donjon; furthermore, it is also likely it was built by the same mason. The original building had two floors, a basement, and a first floor. A settlement developed or grew around the castle. A chapel was part of the castle complex, likely since 1248. Edward I in 1286 issued a patent for a weekly market and annual fair. In 1316, the FitzGeralds became the earls of Kildare, and Maynooth was their chief fortress. However, Maynooth did not stand out from other small manorial villages in the late medieval Dublin environs. In 1328, two mills are mentioned. In the late 15th/16th centuries, the power of the FitzGeralds was at its height as members of the family served as the king's lord deputy in Ireland between 1477 and 1534.

Lewis (1837) mentions that John, the 6th Earl of Kildare from the Kildare branch of the Fitzgerald family, erected a 'magnificent castle here in 1426'; he likely refers to the enlargement of the previously simple design of the donjon. During this time, the castle became 'one of the richest earl's houses under the crown of England' (Horner 1995). In 1515, the king granted a licence for the establishment of the College of the Blessed Virgin Mary of Maynooth. However, following the rebellion of Silken Thomas in 1535, the earl's estates were forfeited to the crown. Following the restoration of the estates in 1552, and the repair of the castle, little is

known about Maynooth village in the second half of the 16th century. In the 1630s, Richard Boyle, earl of Cork, one of the great entrepreneurs, enlarged the castle complex. He was a guardian to George Fitzgerald, who married his daughter. In 1642, however, the great library was destroyed, and the castle was left ruinous in 1647.

The Civil Survey of 1654–55 records a manor house in Maynooth, two corn mills, two malt houses, a chapel, two bridges, and several leases issued suggesting a new tenant population.

In 1678, a patent for a weekly market and two annual fairs, references to the mill, a tan house, a new shop, slaughterhouse, a schoolhouse, and several buildings, suggest late 17th-century Maynooth was a fast-growing village, likely due to its location on the main routes to the west of Dublin. In the late 1690s, a merchant, James McManus, is mentioned concerning Maynooth, and during this time a rectory and an enclosed orchard off Parson Street are developed in the western part of the village. The 1730s saw Maynooth as a post-town with the Dublin-Kinnegad-Mullingar turnpike road constructed (Horner 1995).

In late 1739, the 19th earl of Kildare decided to develop the house (KD006-009----) at nearby Carton as his principal country residence. The Talbot family had erected the first Dutch-style building in Carton, recorded in a painting by Van der Hagen. Subsequently, the estate was forfeited to the Crown and in 1703 sold to Major Gen. Richard Ingoldsby, Lord Justice of Ireland. A two-storey, nine-bay pedimented front with wings was added. It was later sold to the 19th Earl of Kildare who hired Richard Castle to enlarge the house. Major work took place and by the late 1740s the house and the gardens were largely completed. A Charter School is mentioned at this time as being bounded on two sides by a road to Dunboyne and on a third side by a straight, tree-lined avenue, representing Carton Avenue. It is described as extending for a kilometre from the gates at the east end of the main street to the new road, skirting the newly enlarged Carton Demesne. The avenue is in the same axis as the main street that dates to the 1750s (ibid.). In 1757, Rocque mapped Maynooth, giving insight into the organisation and the nature of plots within Maynooth village. He also depicts the current Carton Avenue.

Peter Bere, who was associated with the earl, held several leases on the main street in 1784. He and the earl were largely responsible for the redevelopment of Maynooth. Evidence of a strategy to improve the village layout can be observed as a result (Prunty and Clarke 2011). Street frontages, including the square and green areas along each side of the main street, were developed. In the 1790s, a new axis at right angles to the main street and the construction of Williams Bridge allowed long-distance traffic to be finally diverted away from the castle. The Royal Canal was built to link Dublin and the Shannon and was routed south of Carton and Maynooth. In the western part of the village, a new Roman Catholic college – the Royal College of St Patrick –

was established in Stoyte House, with additional buildings constructed. This had a positive economic impact on the village, offering a source of local employment in addition to the demesne at Carton. The Roman Catholic lay college that opened in 1802 was short-lived and closed by 1820 with its properties absorbed into St Patrick's College. With the population nearly doubled since the mid-18th century, it could now be described as a small town. In the 1830s, a Presentation convent was established in the eastern part of the town, on the site occupied by the charter school that had closed in 1819. This became the girls' national school, with a boys' school in the old chapel, both supported by the Duke of Leinster (Horner 1995).

In the 1820s, the strategy to improve Maynooth's layout, including the street framework, was nearly complete. This allowed the 3rd duke to focus on improving the house and demesne at Carton. In 1819, the courthouse was built on the site of the former market house and shambles. In 1815, Richard Morrison was hired to remodel and enlarge Carton House for the Dukes of Leinster. It was during this time that the demesne of c. 1,000 acres was landscaped.

In 1846, the castle area in Maynooth town was bought out and cleared of houses and cabins, and a garden was established here for the people of Maynooth. Only a few large houses can be noted at this time, e.g. a parochial house and a miller's house on Mill Street, and Crom-a-boo Lodge as part of the charter school site. Rows of houses were built at this time, fronting Charter School Lane, Parson Street, and later, in c. 1900, Dillion's Row of single-storey houses on the Dunboyne Road. Several lanes in the town took their names from the development, e.g. Kelly's Lane from Clement Kelly's grocery shop, Cushin, and Coates Lane, Coffey's Lane, and Doctor's Lane. In the 1850s, the most valued houses were mostly occupying both sides of Main Street.

A masterplan for the town's future development was prepared by architect A.W. Pugin in the 1850s. As a result, St Mary's Square, infirmary, chapel, the Aula Maxima (1894–5), and the great spire (1902) were constructed. The courthouse building was redeveloped to serve as a town hall with concert and meeting rooms.

The town growth weakened and in 1949 the Carton estate was sold. A large out of town scheme for housing at Greenfield, on the south side of the canal and railway, was initiated in 1910. Main Street was tarred. With new water and sewerage schemes in the 1950s and the decision to admit lay students to the college, Maynooth was recognised as within the commuting range of an expanding Dublin and the town grew rapidly. In 1981, the railway was reopened and by 1994 the Leixlip-Kilcock motorway was built.

3.2 Previous Archaeological Investigations

The site was previously subject to a geophysical survey (24R0591; Murphy 2025; see results below). Other assessments were also carried out in the environs of the site and these resulted in archaeological remains being exposed and subsequently excavated. These include two monuments now listed as a Burial Ground (KD010-040----) and a Furnace (KD011-061----), both located to the south of the site (Figure 2). These were identified as a result of archaeological investigations (04E0644; Duffy 2004). Further archaeological investigations to the south identified a ring-ditch/barrow with a Bronze Age burial urn, cremation burial pits, as well as an early medieval cereal-drying kiln and five inhumation burials (19E0235; Gallagher 2019). The sites were previously unknown, with no surface expression. In contrast, test trenching on the site of Gaelscoil Uí Fhiaich adjacent to the R405 Maynooth–Celbridge road to the south exposed no features of archaeological significance (08E0575; O'Hara 2008).

Listed below (Table 1) are the nearest previous archaeological investigations undertaken in the environs of the site (see Figure 2), which further demonstrate the overall archaeological potential of the site and its surrounding townlands. The following information was taken from the *Database of Irish Excavation Reports* (www.excavations.ie) and associated reports were accessed through the National Monuments Service's (NMS) Virtual Reading Room.

Table 1: Previous archaeological investigations within the environs of the site

Excavations.ie reference	Licence No.	Site-Type	Investigation Type
2004:0851 - Moneycooly, Maynooth, Kildare	04E0644	Burial ground and Furnace Early Medieval (AD 400–1099)	Testing Monitoring Excavation
2019:693 - Greenfield, Maynooth, Kildare	17R0009 19E0235	Ring-ditch/bar-row, Bronze Age burial urn, early medieval cereal-drying kiln and in-humation burials	Geophysical Survey Testing Excavation
2008:670 - Gaelscoil Uí Fhiaich, Railpark, Maynooth, Kildare	08E0575	No archaeological significance	Testing

Geophysical Survey (24R0591; Murphy 2025)

The geophysical survey was conducted in April 2025 by Donald Murphy, Robert Breen and Jeanne Rochford of ACSU under licence 24R0591 (Figures 6–7). A full detailed gradiometer survey was undertaken throughout the application area using a SENSYS MAGNETO MXV3 8-sensor fluxgate gradiometer cart system. The anomalies identified are listed in Table 2 below.

Table 2: Geophysical survey results

Anomaly No.	Form/Nature of Anomaly	Possible Source(s) of Anomaly	Description
M1	Archaeology	Ring-ditch	Small circular ring-ditch enclosure with a c. 7.5m diameter along the western portion of Field 1. The anomaly is slightly fainter along its western side and appears to be truncated by cultivation furrows.
M2	?Archaeology	Possible ring-ditch	A faint positive curvilinear anomaly with a diameter of c. 8.5m. It lies c.40m south of the M1 ring-ditch. This feature likely represents another ring-ditch, but it has a weaker response than anomaly M1.
-	?Archaeology	Curvilinear	A positive curvilinear anomaly located directly southeast of M2 may represent the partial remains of a ring-ditch but is disturbed by the buried service to the east.
-	?Archaeology	Small to medium anomalies: pits, posts, spreads, kilns, cut features	A series of positive anomalies occur sporadically across the survey area. These might represent cut features such as pits, postholes, spreads, kilns, or other types of archaeological features. It may also be natural in origin.
-	Linear feature	Former field boundaries	Positive linear anomalies that correspond with former field boundaries depicted on the first edition Ordnance Survey (OS) 6-inch map, surveyed 1835, and the third edition Ordnance Survey (OS) 25-inch map, surveyed 1908, are located within Fields 1 and 2.
-	Linear feature	Early field systems?	Positive linear anomalies in Fields 1 and 2 may represent former field divisions that are not depicted on OS mapping.

Anomaly No.	Form/Nature of Anomaly	Possible Source(s) of Anomaly	Description
-	Magnetic disturbance	Modern disturbance	Magnetic disturbance in the western portion of Field 1 corresponds with modern disturbance in the area from environmental trial pits.
-	Buried service	Modern service	A bipolar response traversing Field 1 corresponds with the laying of a modern service that can be seen in aerial imagery from 2001–2005.
-	Cultivation	Land use/furrows	A series of cultivation furrows occurred in Field 1, predominantly in the southern portion of the field.
-	Ferrous	Magnetic disturbance from modern debris	Bipolar anomalies sporadically occur that are associated with magnetic interference from modern ferrous material, either in the topsoil or the surface of the survey area.

3.3 Recorded Monuments

The *Record of Monuments and Places* (RMP) and *Sites and Monuments Record* (SMR) are compiled and updated by the National Monuments Service and the National Historic Properties Service. The RMP is comprised of manuals that list all known archaeological sites and monuments in a county with accompanying maps (based on Ordnance Survey (OS) six-inch maps) locating these sites. All sites included in the RMP are protected under the National Monuments Acts (1930–2004). The SMR consists of all records stored in the Archaeological Survey of Ireland national database and is presented in the Historic Environment Viewer. The last published RMP for County Kildare is dated 1996, and as such, many of the sites listed in the SMR are scheduled for inclusion in the next revision of the RMP.

The site contains no monuments listed in the RMP or the SMR. Two such sites, a Burial Ground (KD010-040----) and a Furnace (KD011-061----), are recorded outside and 480m and 500m, respectively, to the south of the site. As outlined in Section 3.2, these were identified as a result of archaeological investigations (04E0644; Duffy 2004).

Below (Table 3) is a list of monuments located within the environs of the site (Figure 2). These descriptions are derived from the National Monuments Service Archaeological Survey Database (https://heritagedata.maps.arcgis.com/apps/webappviewer/).

Table 3: Recorded Monuments in the environs of the site

KD010-040----	KD010-040----	KD010-040----

In 2004, in advance of the construction of a large housing estate, archaeological test trenching (Duffy C. Excavation Licence No. 04E0644) followed by monitoring of topsoil-stripping over the entire site resulted in the discovery and excavation of a previously unrecorded burial ground (KD010-040----) and, c. 100m to the ESE, two bowl furnaces (KD011-061----). The burials were on a very slight rise and were set out in six rows within a roughly subrectangular area (14m E-W; 6.5m N-S), with two juvenile burials immediately to the north of the main group. The graves were simple unlined pits excavated through an upper, largely stone-free, subsoil into the surface of a lower stony clay subsoil that formed the base of the cuts. All but two were aligned east-west. There were occasional instances of small slabs laid at the side of the grave or overlying the interments. At least 55 individuals are represented among the burials, including disarticulated remains and skeletons disturbed by later grave-cuts. No artefacts were found with any of the burials, but the cemetery is most likely to date to the Early Christian period.

Six-Inch First edition: Not indicated

Six-Inch Latest edition: Not indicated

ITM Coordinates: 694439 , 736275

Latitude and Longitude: 53.368221 , -6.580947

KD011-061----	KD011-061----	KD011-061----

In 2004, in advance of the construction of a large housing estate, archaeological test trenching (Duffy C. Excavation Licence No. 04E0644) followed by monitoring of topsoil-stripping over the entire site resulted in the discovery and excavation of two bowl furnaces (KD011-061----) and, c. 100m to the WNW, a small burial ground (KD010-040----). Two adjacent bowl furnaces, with diameters of 0.66m and 0.9m and depths of 0.37m and 0.45m respectively, contained metal slag and charcoal. Nearby was a hearth, comprising a char-coal-rich deposit, 0.7m by 0.52m and 0.05m thick, over oxidised subsoil.

References: Duffy C. 2005 Preliminary Report on Archaeological Excavations at Moneycooly, Maynooth, Co. Kildare. Excavation licence No: 04E0644)

Six-Inch First edition: Not indicated

Six-Inch Latest edition: Not indicated

ITM Coordinates: 694532 , 736230

Latitude and Longitude: 53.367800 , -6.579563

KD010-040----	KD010-040----	KD010-040----

In 2004, in advance of the construction of a large housing estate, archaeological test trenching (Duffy C. Excavation Licence No. 04E0644) followed by monitoring of topsoil-stripping over the entire site resulted in the discovery and excavation of a previously unrecorded burial ground (KD010-040----) and, c. 100m to the ESE, two bowl furnaces (KD011-061----). The burials were on a very slight rise and were set out in six rows within a roughly subrectangular area (14m E-W; 6.5m N-S), with two juvenile burials immediately to the north of the main group. The graves were simple unlined pits excavated through an upper, largely stone-free, subsoil into the surface of a lower stony clay subsoil that formed the base of the cuts. All but two were aligned east-west. There were occasional instances of small slabs laid at the side of the grave or overlying the interments. At least 55 individuals are represented among the burials, including disarticulated remains and skeletons disturbed by later grave-cuts. No artefacts were found with any of the burials, but the cemetery is most likely to date to the Early Christian period.

Six-Inch First edition: Not indicated

Six-Inch Latest edition: Not indicated

ITM Coordinates: 694439 , 736275

Latitude and Longitude: 53.368221 , -6.580947

KD011-061----	KD011-061----	KD011-061----

In 2004, in advance of the construction of a large housing estate, archaeological test trenching (Duffy C. Excavation Licence No. 04E0644) followed by monitoring of topsoil-stripping over the entire site resulted in the discovery and excavation of two bowl furnaces (KD011-061----) and, c. 100m to the WNW, a small burial ground (KD010-040----). Two adjacent bowl furnaces, with diameters of 0.66m and 0.9m and depths of 0.37m and 0.45m respectively, contained metal slag and charcoal. Nearby was a hearth, comprising a charcoal-rich deposit, 0.7m by 0.52m and 0.05m thick, over oxidised subsoil.

References: Duffy C. 2005 Preliminary Report on Archaeological Excavations at Moneycooly, Maynooth, Co. Kildare. Excavation licence No: 04E0644)

Six-Inch First edition: Not indicated

Six-Inch Latest edition: Not indicated

ITM Coordinates: 694532 , 736230

Latitude and Longitude: 53.367800 , -6.579563

3.4 Record of Protected Structures and National Inventory of Architectural Heritage

The *National Inventory of Architectural Heritage* (NIAH) identifies, records, and evaluates the post-1700 architecture of Ireland in order to protect and conserve our built heritage. It is under the administration of the Department of Housing, Local Government and Heritage. It also forms the basis of a list of structures that should be included in the Record of Protected Structures (RPS) compiled by local authorities. A Protected Structure is a structure that a planning authority thinks is of special interest from an architectural, historical, archaeological, artistic, cultural, scientific, social, or technical point of view. The structure is recognised as important and is protected from harm under legislation. Every local authority in Ireland must keep an RPS in their development plans.

The site does not contain any Protected Structures, as listed in the *Kildare County Development Plan 2023–2029*, nor any structures listed in the NIAH. The nearest such structure is a Lime Kiln (B06-06) located c. 310m to the northeast of the site. Rockfield House, just south-west of the site, is depicted on the 1835 OS map and is named on the 1908 OS map (Figures 3–4), however, it is not listed in the NIAH and while it is visible on the 1995 aerial photography it was demolished by the time of the 1996–2006 aerial imagery.

3.5 Finds listed within the Topographical Files of the National Museum of Ireland

The Topographical Files of the National Museum of Ireland list all artefacts in the care of or known to the museum. Such a record can provide evidence for human settlement or activity in the absence of other physical remains or documentary references.

There are no finds for the townland of Railpark listed in the Topographical Files, however, there are eleven finds listed for Maynooth. These include two stone axeheads (NMI Reg. Nos 1945:259 and 1967:101), a lead

object (NMI Reg. No. 1995:2003), a bronze brooch (SA1925:8) and six copper alloy finds, comprising four rings (NMI Reg. Nos 1995:2004–2007), a button (NMI Reg. No. 1995:2001) and a mount (NMI Reg. No. 1995:2002).

3.6 Cartographic Evidence

A review of available historic mapping for the area was carried out to include the Ordnance Survey (OS) of Ireland (now Tailte Éireann) 6-inch (surveyed 1835, published 1837) and 25-inch (surveyed 1908–09, published 1910) maps (Figures 3–4), as well as pre-OS mapping that includes Keenan and Noble's map of county Kildare (1752) and Taylor's map of County Kildare (1783). Potential archaeological or cultural heritage features are often marked on such maps and they can provide a useful resource in identifying sites, particularly if they no longer have any above-ground remains.

The pre-Ordnance Survey mapping examined did not give any detail in relation to the site, however, a road is shown traversing the site on Keenan and Noble's 1752 map.

The site is depicted as incorporating part of four agricultural fields on the 1835 OS map (Figure 3), with one of these field boundaries removed by the time of the 1908 OS map, which also depicts a spring abutting the northern boundary (Figure 4). This might suggest that this boundary of the site, depicted as a narrow strip on the 1836 map, was not a road/track but a wet ditch.

No features of archaeological significance were recorded on the examined mapping, however, the line of the road depicted on the 1752 map may be considered historically significant if the mapping is accurate and an abandoned 18th-century road did once cross this field. However, no trace of this was road was identified by the geophysical survey (24R0591; Murphy 2025), nor by the test trenching under discussion here.

3.7 Aerial Photography

A review of available aerial photography for the area was also undertaken as part of this assessment. Aerial photographs dating between 1995 and 2018 from Tailte Éireann were assessed, alongside Google Earth imagery dating between 2006 and 2025. Unrecorded archaeological sites can often be identified in aerial photographs as cropmarks or differential growth in a field, particularly during periods of drought, such as those experienced in the summer of 2018.

By the time of the 1995 aerial image, further field boundaries had been removed, and on the 2001–2005/2006–2012 aerial images, a wide strip traversing the site roughly northwest to southeast was visible. It

likely represents a service pipe. The area was returned to pasture thereafter but the route of the pipeline is visible as a linear cropmark on subsequent aerial images.

No features of archaeological significance were recorded on examined aerial imagery.

4. METHODOLOGY

4.1 Test Excavation

Test Excavation

Test excavation was carried out in accordance with the *IAI Code of Conduct for Archaeological Assessment Excavation* (Institute of Archaeologists of Ireland 2006). All trenches were excavated to natural or surface of archaeological remains by a mechanical excavator with a toothless grading bucket under the direct supervision of a suitably qualified archaeologist (Ian Russell).

All spoil from the trenches was also examined for artefacts.

4.2 Conditions

Weather throughout the duration of the on-site works was changeable with periodic rain or overcast conditions, however, a safe means of access to the site was maintained at all times. No livestock were present in the fields during the test trenching.

4.3 Constraints on Methods

Of the 61 test trenches proposed within the site, 51 were excavated. Trenches 11–17, Trench 23 and Trench 73 were located in the northeast area of the site (Figures 7 and 11), which was undergoing construction for the Maynooth Eastern Relief Road (MERR) and being used temporarily for topsoil storage. Therefore, test trenching in this area was unfeasible at this time. In addition, Trench 56 could not be excavated due to the presence of a modern sewer line in this area (see Plate 65).

Trenches 61–72 proposed for the northern portion of the site (extra area) were outside the site boundary and may be subject to test excavation in the future.

5. TEST EXCAVATION RESULTS

A total of 51 trenches were excavated (Figures 7 and 11; Plates 1–69). Across the site, the topsoil (C1) ranged from a mid-brown clayey silt to a dark brown silty clay. The natural (C2) is a stony, orange-brown boulder clay with stony grey subsoil. Features of archaeological significance were identified in Trenches 43, 45 and 53.

A circular ring-ditch identified as dark brown clay and charcoal (C4301) was found in the north end of Trench 43. This was identified in the previous geophysical survey immediately southeast of M2 (24R0591; Murphy 2025; Figures 7–8; Plates 37–38).

A possible masonry structure (C4501) was identified at the west end of Trench 45. The feature is circular in plan and constructed with stone and lime mortar with an interior fill of grey clay and lime mortar (Figures 7 and 9; Plates 41–44).

The northeast end of Trench 53 was extended to the northwest and southeast to examine the archaeological remains exposed here, with four human inhumation burials, a ring-ditch with a possible extension and a second possible ring-ditch identified in this area (Figures 7 and 10; Plates 53–62). Burial 1 consists of the outline of a possible grave cut (C5303) and was identified within a ring-ditch (C5302) filled with fine orange-brown clay (Plates 55–57). An extension cut (C5304) filled with a similar orange-brown clay was identified to the north of the ring-ditch, stopping just short of Burial 2 (Plate 58). Burial 2 (C5305) was identified to the immediate north of the extension cut. It is aligned east–west and filled with a dark brown clay (Plates 59–60). Burial 3 (C5306) is to the immediate west of Burial 2, and it extended under the east baulk of Trench 53. It comprises a dark brown clay with human bone evident in the fill (Plate 61). Burial 4 (C5307) was identified to the immediate west of Burials 2 and 3 and consists of a fill of dark brown clay (Plate 62). ACSU osteoarchaeologist, Glenn Gibney, visited the site to confirm the visible remains as human (see Section 6.1).

A curvilinear feature (C5301), perhaps a second ring-ditch, was found to the southwest of ring-ditch C5302, also in Trench 53. This feature is circular in plan and extended southwards from the baulk of the trench. It is filled with a brown clay with frequent charcoal (Figures 7 and 10; Plates 53–54).

Table 4: Trench descriptions

Trench Number	Length (m)	Trench depth (m)	Description
1	49	0.50	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 1).

Trench Number	Length (m)	Trench depth (m)	Description
2	51	0.50	Northeast to southwest aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 2).
3	42	0.60	Northeast to southwest aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 3).
4	52	0.40	North to south aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 4).
5	52	0.50	ENE to WSW aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 5).
6	53	0.50	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 6).
7	40	0.50	ENE to WSW aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 7).
8	46	0.50	Northwest to southeast aligned trench. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 8).
9	54	0.50	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 9).
10	31	0.40	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 10).
11	-	-	Trench not excavated. The northeast area of the site was undergoing construction for a road, therefore, trenching was not feasible at this time.
12	-	-	Trench not excavated. The northeast area of the site was undergoing construction for a road, therefore, trenching was not feasible at this time.
13	-	-	Trench not excavated. The northeast area of the site was undergoing construction for a road, therefore, trenching was not feasible at this time.

Trench Number	Length (m)	Trench depth (m)	Description
14	-	-	Trench not excavated. The northeast area of the site was undergoing construction for a road, therefore, trenching was not feasible at this time.
15	-	-	Trench not excavated. The northeast area of the site was undergoing construction for a road, therefore, trenching was not feasible at this time.
16	-	-	Trench not excavated. The northeast area of the site was undergoing construction for a road, therefore, trenching was not feasible at this time.
17	-	-	Trench not excavated. The northeast area of the site was undergoing construction for a road, therefore, trenching was not feasible at this time.
18	43	0.40	North to south aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 11).
19	32	0.60	Northeast to southwest aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 12).
20	39	0.50	East to west aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 13).
21	30	0.50	NNE to SSW aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 14).
22	51	0.60	Northeast to southwest aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 15).
23	-	-	Trench not excavated. The northeast area of the site was undergoing construction for a road, therefore, trenching was not feasible at this time.
24	44	0.50	ENE to WSW aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 16).
25	30	0.50	North to south aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 17).
26	32	0.50	Northwest to southeast aligned trench. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 18).

Trench Number	Length (m)	Trench depth (m)	Description
27	30	0.50	NNE to SSW aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil with protrusions of larger natural boulders. A modern field boundary/hedge line was present in the trench (Plate 19). No archaeological features were identified.
28	30	0.60	Northeast to southwest aligned trench. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 20).
29	31	0.50	Northwest to southeast aligned trench. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 21).
30	54	0.60	East to west aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 22).
31	41	0.50	ENE to WSW aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 23).
32	38	0.50	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 24).
33	40	0.50	NNE to SSW aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 25).
34	52	0.70	NNW to SSE aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 26).
35	49	0.50	Northeast to southwest aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 27).
36	41	0.50	Northeast to southwest aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay and grey stony subsoil. No archaeological features were identified (Plate 28).
37	38	0.50	North to south aligned trench measures 38m in length and 0.50m in maximum depth. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 29).

Trench Number	Length (m)	Trench depth (m)	Description
38	40	0.50	North to south aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay (Plate 30). An east–west modern ditch identified during geophysical survey and represented on the 1838 Ordnance Survey map as a field boundary was identified in the trench. It measured 2m in width and tree roots were present in the fill (Plate 31). No archaeological features were identified.
39	54	0.50	North to south aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder mixed with stony grey subsoil (Plate 32). Softer boulder clay occurred at the north end of the trench, near the location of the geophysical survey anomaly (M2) (Figure 7) and between two very stony subsoil sections, which may account for the anomaly. No archaeological features were present. The early modern east–west ditch identified in Trench 38 was also identified in this trench, with tree roots present in the fill. No archaeological features were identified.
40	31	0.40	NNE to SSW aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 33).
41	30	0.40	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 34)
42	52	0.50	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 35).
43	31	0.50	North to south aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay (Plate 36). A circular ring-ditch (C4301) was identified at the location of a geophysical survey anomaly, in the north end of the trench (Figure 7). It was identified as a fill of dark brown clay and charcoal measuring c. 4.5m in internal diameter, while the ditch measured 1m in width (Figure 8; Plates 37–38).
44	51	0.70	WNW to ESE aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of a mixed orange-brown boulder clay with stony grey subsoil. No archaeological features were identified (Plate 39).
45	42	1.00	WNW to ESE aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay mixed with grey stone (Plate 45). A possible masonry structure (C4501) was identified near the west end of the trench (Figures 7 and 9). The feature is circular in plan and constructed

Trench Number	Length (m)	Trench depth (m)	Description
			with stones and lime mortar. The possible wall located to the west is 1.30m in width, while the wall to the east is 0.50m in width. The possible structure has an internal diameter of 3m with an interior fill of grey clay with stone and lime mortar (Plates 41–44).
46	50	0.50	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay at the very northwest and very stony grey subsoil over the rest of the trench. No archaeological features were identified (Plate 45).
47	44	0.50	Northeast to southwest aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 46).
48	41	0.40	Northeast to southwest aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 47).
49	40	0.50	Northeast to southwest aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown stony boulder clay. No archaeological features were identified (Plate 48).
50	50	0.50	Northeast to southwest aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay at the northeast end of the trench and stony grey subsoil at the southwest end of the trench. No archaeological features were identified (Plate 49).
51	54	0.40–0.50	WNW to ESE aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 50).
52	42	0.40–0.50	Northeast to southwest aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 51).
53	55	0.30–0.50	Northeast to southwest aligned trench measuring 0.50m in depth but was shallower at the north end where it was only 0.30m in depth. At the northeast end, this trench was subsequently extended to the northwest and to the southeast to examine the horizontal extend of the archaeological remains uncovered (Figure 7; Plates 52–62). Four human inhumation burials, a ring-ditch with a possible extension to the north and a curvilinear feature, possibly representing a second ring-ditch, were identified in this area (Figure 10). Burial 1 (C5303) was identified inside a ring-ditch (C5302). The ring-ditch is circular in shape and measures 0.80–1.10m in width with an internal diameter of 6m (Plates 55–56). The ditch is filled with a fine orange-brown

Trench Number	Length (m)	Trench depth (m)	Description
			clay. Burial 1 (C5303) consists of a grave cut measuring 1.90m in length and 0.70m in width, filled with a dark clay (Plate 57). An extension cut (C5304), measuring 0.60m in width and filled with an orange-brown clay, was located to the immediate north of the ring-ditch, stopping just short of Burial 2 (Plate 58). Burial 2 (C5305) was identified to the immediate north of the extension cut (C5304). It is aligned east–west and is 1.40m in length and 0.50m in width, filled with a dark brown clay (Plates 59–60). Burial 3 (C5306) was identified directly east of Burial 2, also aligned east–west. It comprises a grave cut with a dark brown clay fill, measuring 1.60m in length and 0.50m in width, continuing into the baulk of the trench (Plate 61). Burial 4 (C5307) comprises a grave cut measuring 1.80m in length and 0.60m in width filled with a dark brown clay (Plate 62). Fragments of skull were visible within the west end of the grave cut, meaning the skeleton is likely articulated (Plate 62). A curvilinear cut with a charcoal-rich brown clay fill (C5301) was found to the southwest of the other features, measuring c. 1.50m in internal diameter and 0.60m in width (Plates 53–54).
54	56	0.60	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 63).
55	40	0.70	ENE to WSW aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 64).
56	-	-	Trench not excavated as a new sewer has recently been laid along this line (Plate 65).
57	50	0.50	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 66).
58	50	0.70	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 67).
59	42	0.60	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. No archaeological features were identified (Plate 68).
60	26	0.50	Northwest to southeast aligned trench. The topsoil (C1) was a dark brown silty clay. The natural (C2) consisted of an orange-brown boulder clay. The

Trench Number	Length (m)	Trench depth (m)	Description
			trench was shortened to the southeast as it ran into the wayleave for the construction of an inner relief road adjacent to the immediate east of the site. No archaeological features were identified (Plate 69).
73	-	-	Trench not excavated. The northeast area of the site was undergoing construction for a road, therefore, trenching was not feasible at this time.

Table 5: Context descriptions

Context	L(m)	W(m)	D(m)	Basic Description
C1	-	-	0.30–1.00	Topsoil of dark brown silty clay.
C2	-	-	-	Natural of orange-brown boulder clay with stony grey subsoil.
C4301	-	1.00	-	A circular ring-ditch measuring 1m in width and c. 4.50m in internal diameter filled with a dark brown clay and charcoal. Found in the north end of Trench 43.
C4501	-	0.50–1.30	-	A possible masonry structure. Circular in plan and constructed with stone and lime mortar with an internal diameter of c. 3m and interior fill of grey clay with stone and lime mortar. Located in the WNW end of Trench 45.
C5303	1.90	0.70	-	Burial 1 consists of a possible grave cut 1.90m in length and 0.70m in width filled with a brown clay and evidence of human bone. This was found within a ring-ditch (C5302) located in the northeast end of Trench 53.
C5302	-	0.80–1.10	-	A ring-ditch measuring 0.80–1.10m in width and 6m in internal diameter filled with a fine orange-brown clay and contains at least one internal inhumation (C5303). Located in the northeast end of Trench 53.
C5304	-	0.60	-	An extension cut measuring 0.60m in width, filled with an orange-brown clay to the immediate north of the ring-ditch (C5302), stopping just short of Burial 2 (C5305). Located in the northwest extension to Trench 53.

Context	L(m)	W(m)	D(m)	Basic Description
C5305	1.40	0.50	-	Burial 2 is aligned east–west and measures 1.40m in length and 0.50m in width, filled with a dark brown clay with evidence of human bone in the fill. This was identified to the immediate north of the extension cut (C5304), in the northwest extension to Trench 53.
C5306	1.60	0.50	-	Burial 3 is aligned east–west and measures 1.60m in length and 0.50m in width, filled with a dark brown clay with human bone evident in the fill. It was found to the immediate west of Burial 2 (C5305) and extended under the east baulk of the northwest extension to Trench 53.
C5307	1.80	0.60	-	Burial 4 is aligned east–west and measures 1.80m in length and 0.60m in width, filled with a dark brown clay with fragments of human skull at the west end of the feature. It is located to the west of Burial 2 (C5305) and Burial 3 (C5306), in the northwest extension to Trench 53.
C5301	-	0.60	-	A curvilinear feature measuring c. 1.50m in internal diameter and 0.60m in width, filled with a brown clay with frequent charcoal. Circular in plan and extending southwards from the northern baulk of Trench 53.

6. MATERIAL CULTURE

No archaeological objects or finds were recovered, and no palaeo-environmental samples were taken as no exposed archaeological features were investigated further.

6.1 Human bone

Human bone was identified in Trench 53 at Burials 1–4 (Burial 1: C5303; Burial 2: C5305; Burial 3: C5306; Burial 4: C5307). The human bone was left in situ and the inhumations were not excavated. An assessment by ACSU osteoarchaeologist Glenn Gibney confirmed Burials 1–4 were articulated human burials and any further investigation was halted. The Gardaí, Kildare Coroner's Office, National Museum of Ireland and the National Monuments Service were all informed.

It is now proposed to excavate, record and lift the identified burials. Additionally, it is proposed to excavated any further burials that may be present within the surrounding area and identified when the area is stripped of topsoil under archaeological supervision.

7. CHRONOLOGY/DATING

Potential archaeological features identified during test trenching at Railpark, Maynooth, include four curvilinear/linear ditches (C4301, Trench 43; C5301, C5302 and C5304, Trench 53), a masonry structure (C4501, Trench 45) and four inhumation burials (Burial 1: C5303; Burial 2: C5305; Burial 3: C5306; Burial 4: C5307, Trench 53) (Figures 8–10).

Although more accurate dating will not be available until the excavation and post-excavation processes are complete, estimates can be made based on the typologies of the features.

The curvilinear/linear ditches may represent ring-ditches or barrow monuments. Towards the end of the Neolithic period and the beginning of the Bronze Age, features known as 'barrows' emerged and these can be defined as earthen or earth/stone construction mounds with a surrounding ditch or ditches, sometimes with a low external bank, typically less than 30 metres in diameter and most commonly associated with cremation burials (O'Sullivan and Downey 2012). In 2002, in advance of the gas pipeline works from North Dublin to Limerick, ring-diches/barrows were excavated at Flemingtown, Co. Meath, Dalystown 1, Co. Westmeath, Knockuregare, Co. Limerick and Rath, Co. Dublin (Grogan et al. 2007). All of these sites had substantial ditches, the largest having an external diameter of 38.75m. The excavations provided evidence for this type of funerary site occurring throughout the Chalcolithic and Bronze Age periods (2450–800 BC) and highlighted the significance of liminal space for death and burial in the form of ceremonial enclosures. McGarry (2009) states that the late prehistoric (c. 1300 BC–AD 400) burial ring-ditches he examined across Ireland averaged 11m in external diameter but varied considerably in size, with very few exceeding 25m in diameter and a considerable number measuring less than 7m, with the smallest examples being less than 3m. About half produced the remains of a single person, most commonly found under the mound and central to the barrow. Almost all sites, however, produce cremated human remains spread throughout the fill of the barrow ditches; as can be seen at sites such as Ballybeen, Co. Antrim (Mallory 1984) and Ballydribbeen, Co. Kerry (Dunne 2003). Another interesting feature of barrows is the presence or absence of an 'entrance' or break in the ditch, which provides a causeway into the monument. Entrances are present in a number of ring-ditches and ring-barrows and although the entrance may be orientated in any direction there is a clear preference for them facing either

east or south-east. It must be noted, however, that there are also many instances were entrances are not present, such as Donacarney, Co. Meath (Stirland 2017).

The human remains found during testing represent inhumations, which are when fleshed bodies were placed in the ground in an unburnt state. Alongside cremations, crouched inhumations were practiced during the Bronze Age but declined during the Late Bronze Age before being re-introduced in the later Iron Age during the second century BC and the first century AD (O'Brien 2020, 34). Extended inhumation, with the arms flat and the legs straight, was introduced to Ireland, most likely from Britain, in the early centuries AD and became the dominant burial rite from the fifth century onwards (ibid., 49). While cremation did not disappear completely in the Medieval period, it became far less common (Gleeson and McLoughlin 2021). There are a number of reasons for this shift away from cremation to inhumation in the archaeological record of the fifth and sixth centuries AD. Perhaps the biggest reason was the rise of Christianity in Ireland. According to O'Brien (2020, 200), early Medieval Christian writers regarded cremation as a pagan rite. The rite of extended inhumation was ultimately incorporated into the Christian ethos, where it became the practice to orientate the burial east–west (with the head to the west). O'Brien (2020, 54), however, argues that east–west orientation during this period does not automatically mean they were buried according to Christian practices. Indeed, in the Later Medieval cemetery at Ballyhanna, Co. Donegal, a number of burials were orientated against Christian norms (McKenzie and Murphy 2018). Grave goods found next to a number of skeletons at Ballyhanna, suggestive as evidence of Christian pilgrimage, indicates that the orientation was based on the site topography as well as the physical impairment of the individual. Although burial in familial cemeteries continued for a number of years, there was increasing pressure to bury the dead in church-controlled cemeteries and by the eighth century extended inhumations in church cemeteries became the norm (McGarry 2010).

The burials identified during testing at Railpark were associated with ring-ditches by being placed either adjacent to or within a ring-ditch. This is similar to Southgreen, Co. Kildare (19E0009) which has been interpreted as a transitory cemetery (Murphy 2021; Gibney 2023). Similar to Southgreen, the burials identified during testing at Railpark, Maynooth, may be an attempt to monumentalise graves by surrounding them with a ring-ditch (Gibney 2023).

In addition, the masonry structure uncovered in Trench 45 resembles the remains of a lime kiln. Lime kilns are one of the most common monuments of industrial heritage in Ireland. They are furnace-type structures used to produce lime by heating limestone at high temperatures of up to 1,000 degrees Celsius. The process is known as quicklime or burnt lime, and the product was used in building, agriculture and related purposes.

Farm lime kilns were used throughout Ireland in the 18th and 19th centuries, although the burning of limestone to apply to soil was a common practice between the 12th and 17th centuries on a smaller scale (O'Sullivan and Downey 2005). While there are no lime kilns depicted within the site on the OS 6-inch (1835) and 25-inch (1908–09) mapping (Figures 3–4), there is a lime kiln illustrated c. 365m to the northeast of the site on both maps. This is also within Railpark townland and on the 6-inch map it is positioned adjacent two buildings that likely represent a farmhouse and an associated outhouse, while by the time of the 25-inch map the layout of buildings has changed but the Lime Kiln (labelled L.K.) is still present.

8. IMPACT ASSESSMENT

Fifty test trenches were excavated within the site. The remnants of a circular ring-ditch with dark brown clay and charcoal (C4301) was found in the north end of Trench 43. This was identified in the previous geophysical survey immediately southeast of M2 (24R0591, Murphy 2025; Figures 7–8; Plates 37–38). A possible masonry structure (C4501) was identified at the west end of Trench 45 (Figures 7 and 9; Plates 41–44). The feature is circular in plan and constructed with stone and lime mortar, with an interior fill of grey clay and lime mortar. Four human inhumation burials (C5303, C5305, C5306, C5307), a ring-ditch (C5302) with a possible extension (C5304) and a second possible ring-ditch (C5301) were identified in the northeast end of Trench 53 (Figures 7 and 10; Plates 53–62). One of the inhumation burials (Burial 1: C5303) is orientated northeast–southwest and within the larger ring-ditch (C5302), with the remaining three inhumation burials (Burial 2: C5305, Burial 3: C5306, Burial 4: C5307) orientated east–west and located just north of the same ring-ditch. The extension cut (C5304), filled with an orange-brown clay, was identified to the north of this ring-ditch, stopping just short of Burial 2. The second possible ring-ditch is a curvilinear feature (C5301) filled with a brown clay with frequent charcoal. It was located to the southwest of the larger ring-ditch.

The proposed development will directly impact the identified archaeological features. Preservation in situ is not an option; therefore, preservation by record (full excavation) is recommended. Before construction commences, topsoil should be removed from around these features under direct archaeological supervision and the identified features, along with any additional features exposed within these areas, should be preserved by record (full excavation). It is also recommended that any topsoil stripping of the wider site is monitored by an archaeologist (see Section 9 also).

9. CONCLUSIONS & RECOMMENDATIONS

This report details the results of test excavations carried out at Railpark, Maynooth, Co. Kildare (ITM 694600, 737000; Figures 1–11; Plates 1–69). The site covers c. 16ha and consists of two agricultural fields. The test excavations were carried out in early January 2026 by Ian Russell under excavation licence 25E0711. The northern portion of the site (extra area) is outside the site boundary and may be subject to test excavations in the future (Trenches 61–72 on Figures 7 and 11).

A total of 61 test trenches were proposed and 51 trenches (Trenches 1–10, 18–22, 24–55, 57–60) were excavated down to natural or the surface of archaeological remains. Trenches 11–17, 23 and 73 in the northeast of the site were unfeasible as this area was undergoing construction for the Maynooth Eastern Relief Road (MERR) and being used temporarily for topsoil storage. Trench 56 could also not be excavated due to the presence of a modern sewer line. The topsoil (C1) ranged from a mid-brown clayey silt to a dark brown silty clay and measured between 0.30m and 1.00m in thickness. The natural (C2) was a stony, orange-brown boulder clay with stony grey subsoil. Features of archaeological significance were identified in Trenches 43, 45 and 53. The northeast end of Trench 53 was extended to the northwest and southeast to examine the horizontal extent of the archaeological remains exposed there.

The remnants of a probable ring-ditch (C4301) was found in the north end of Trench 43. This was identified in the previous geophysical survey immediately southeast of M2 (24R0591, Murphy 2025; Figures 7–8; Plates 37–38). The ditch measures c. 1m in width it has an internal diameter of c. 4.50m. A masonry structure (C4501), circular in plan and possibly representing the remains of a lime kiln, was identified at the west end of Trench 45 (Figures 7 and 9; Plates 41–44). Four human inhumation burials (C5303, C5305, C5306, C5307), a ring-ditch (C5302) with a possible extension (C5304) and a second possible ring-ditch (C5301) were identified in the northeast end of Trench 53 (Figures 7 and 10; Plates 53–62). Burial 1 consisted of the outline of a possible grave cut (C5303) and was identified within the larger ring-ditch (C5302). Burials 2 (C5305), 3 (C5306) and 4 (C5307) were to the north of this ring-ditch, orientated east–west and represented by fills of dark brown clay with human bone. Ring-ditch C5302 has a ditch measuring 0.80–1.10m in width and is 6m in internal diameter, while the second possible ring-ditch, C5301, is to the southwest and consists of a ditch that measures 0.60m in width and has an internal diameter of 1.50m.

Due to the significance of the features found in Trenches 43, 45, and 53, the proposed development will have a direct impact on the archaeology in these parts of the site.

Therefore, it is recommended that these features be investigated and persevered by record (fully excavated by hand) before any further works are carried out in these areas of the site. It is also recommended that any

topsoil stripping of the site is monitored by an archaeologist, including the northeast area (east of the MERR) that was not accessible during these test excavations. Both excavation and monitoring must be carried out by a suitably qualified archaeologist working under licence from the Department of Housing, Local Government and Heritage. Archaeological material identified during monitoring may necessitate further mitigation, including preservation in situ (avoidance) or preservation by record (excavation) following consultation with the National Monuments Service.

10. EXCAVATION BULLETIN

County: Kildare

Site name: Railpark, Maynooth, Co. Kildare

Sites and Monuments Record No.: N/A

Licence number: 25E0711

Author: Ian Russell

Site type: Rural/Greenfield

Period/Dating: Prehistoric – early medieval; early modern

ITM: 694600, 737000

Date of completion: January 2026

Summary:

A total of 51 trenches were excavated down to natural or the surface of archaeological remains. The topsoil (C1) ranged from a mid-brown clayey silt to a dark brown silty clay and measured between 0.30m and 1.00m in thickness. The natural (C2) was a stony, orange-brown boulder clay with stony grey subsoil. Features of archaeological significance were identified in Trenches 43, 45 and 53. The northeast end of Trench 53 was extended to the northwest and southeast to examine the horizontal extent of the archaeological remains exposed there.

The remnants of a circular ring-ditch represented by dark brown clay and charcoal (C4301) was found in the north end of Trench 43. This was identified in a previous geophysical survey immediately southeast of M2 (24R0591, Murphy 2025). The ditch measures c. 1m in width it has an internal diameter of c. 4.50m.

A possible masonry structure (C4501) was identified at the west end of Trench 45. This feature is circular in plan and constructed with stone and lime mortar, with an interior fill of grey clay and lime mortar. It likely represents the remains of an 18th/19th-century lime kiln.

Four human inhumation burials (C5303, C5305, C5306, C5307), a ring-ditch (C5302) with a possible extension (C5304) and a second possible ring-ditch (C5301) were identified in the northeast end of Trench 53. One of the inhumation burials was orientated northeast–southwest and within the ring-ditch, with the remaining three inhumation burials orientated east–west and located just north of the same ring-ditch. All burials were represented by fills of dark brown clay with human bone visible; this was confirmed by an osteoarchaeologist and all further investigation was halted. The associated ring-ditch, represented by an orange-brown clay, has a ditch measuring c. 0.80–1.10m in width and is 6m in internal diameter. A north–south extension cut (C5304), filled with a similar orange-brown clay, was identified to the north of this ring-ditch, stopping just short of one of the east–west burials. The second possible ring-ditch, located to the southwest of the larger ring-ditch, is a curvilinear feature filled with brown clay with frequent charcoal. It consists of a ditch that measures 0.60m in width and has an internal diameter of 1.50m.

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11. PUBLICATION PLAN

An account of this archaeological assessment and its results will be published online as an excavation bulletin for the *Database of Irish Excavation Reports* (see Section 10).

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An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreachta
Department of Housing,
Local Government and Heritage

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Site Owner	Cozone Ventures Ltd
Address	36-42 Donnybrook House, Donnybrook Road, Dublin 4, D04 E6X0
Planning Authority	Kildare County Council
Planning Reg. No.	LRD 2561119
Excavation Type	Test Excavation
Site	Railpark, Maynooth, Co. Kildare
Contractor/Developer	D/RES Properties

Description of Proposed Development

The site is located in the townland of Railpark, Maynooth, Co. Kildare (ITM 694600, 737000). The site measures c. 16ha and consists of two grassed fields. The site lies to the north of M4 Motorway and south of the railway line and the Royal Canal, to the southeast of Maynooth town.

The proposed development consists of 581 no. residential units, a neighbourhood centre and all associated development, on a site of approximately 15.98 hectares.

The residential component of the development consists of 166 no. apartment / duplex units and 415 no. houses to be provided as follows:

- 61 no. 2 bed two storey terraced houses;
- 58 no. 3 bed two storey terraced houses;
- 91 no. 3 bed two storey end terrace houses semi-detached houses;
- 138 no. 3 bed two storey semi-detached houses;
- 64 no. 4 bed two storey semi-detached houses;
- 3 no. 4 bed two storey detached houses;
- 166 no. duplex apartments / apartments (50 no. 1 beds, 88 no. 2 beds and 28 no. 3 beds) in a series of 3 to 4 storey duplex apartment / apartment blocks;

- All duplex apartments / apartment units to have balcony, terrace or private garden.

The neighbourhood centre is in two 5 storey blocks around a public plaza area and includes a childcare facility (732 sq.m), café (166 sq.m), medical centre (259 sq.m), pharmacy/shop (134 sq.m) and a convenience shop (106 sq.m). 74 no. apartments and 12 no. own door duplex units are provided from ground to fourth floor level of the neighbourhood centre.

A total of 888 no. car parking spaces are proposed, which includes 711 no. in-curtilage spaces for houses, 115 no. spaces for the duplex apartments / apartments, 14 no. for the commercial uses at the neighbourhood centre, 12 no. spaces for the staff of the childcare facility and 36 no. visitor spaces for residents. A total of 606 no. cycle spaces are proposed for residents, 40 no. spaces for the neighbourhood centre uses and 83 no. visitor cycle parking spaces.

The proposal includes hard and soft landscaping, lighting, boundary treatments, communal open space, 2.72 ha of public open space including a Local Park and Pocket Parks, children's play areas and an and an ancillary play area for the childcare facility.

The proposed development provides for access from the permitted Maynooth Eastern Ring Road (MERR), including a new pedestrian/cyclist signalised crossing, associated internal roads, pedestrian and cycle paths and access points provided up to the application site boundary to provide for potential future connections to adjoining lands to the north and south, subject to agreement with the Planning Authority / adjacent landowner.

Archaeological Condition

The test trenching was carried out as part of a Further Information Request, as recommended by the Department of Housing, Local Government and Heritage.

Impact Statement and Recommendations

Archaeological testing was carried out by Ian Russell under excavation licence 25E0711, issued by the Department of Housing, Local Government and Heritage, in consultation with the National Museum of Ireland. A total of 61 test trenches were proposed within the current site and 51 trenches were excavated down to natural or the surface of archaeological remains. Trenches 11–17, 23 and 73 in the northeast of the site were unfeasible as this area was undergoing construction for the Maynooth Eastern Relief Road (MERR) and being used temporarily for topsoil storage. Trench 56

could also not be excavated due to the presence of a modern sewer line. The topsoil ranged from a mid-brown clayey silt to a dark brown silty clay, and measured between 0.30m and 1.00m in thickness. The natural was a stony, orange-brown boulder clay with stony grey subsoil. Features of archaeological significance were identified in Trenches 43, 45 and 53. The northeast end of Trench 53 was extended to the northwest and southeast to examine the horizontal extent of the archaeological remains exposed there.

A circular ring-ditch, identified as dark brown clay and charcoal, was found in the north end of Trench 43. This was also identified in a previous geophysical survey, immediately southeast of M2 (24R0591). The ditch measures c. 1m in width it has an internal diameter of c. 4.50m.

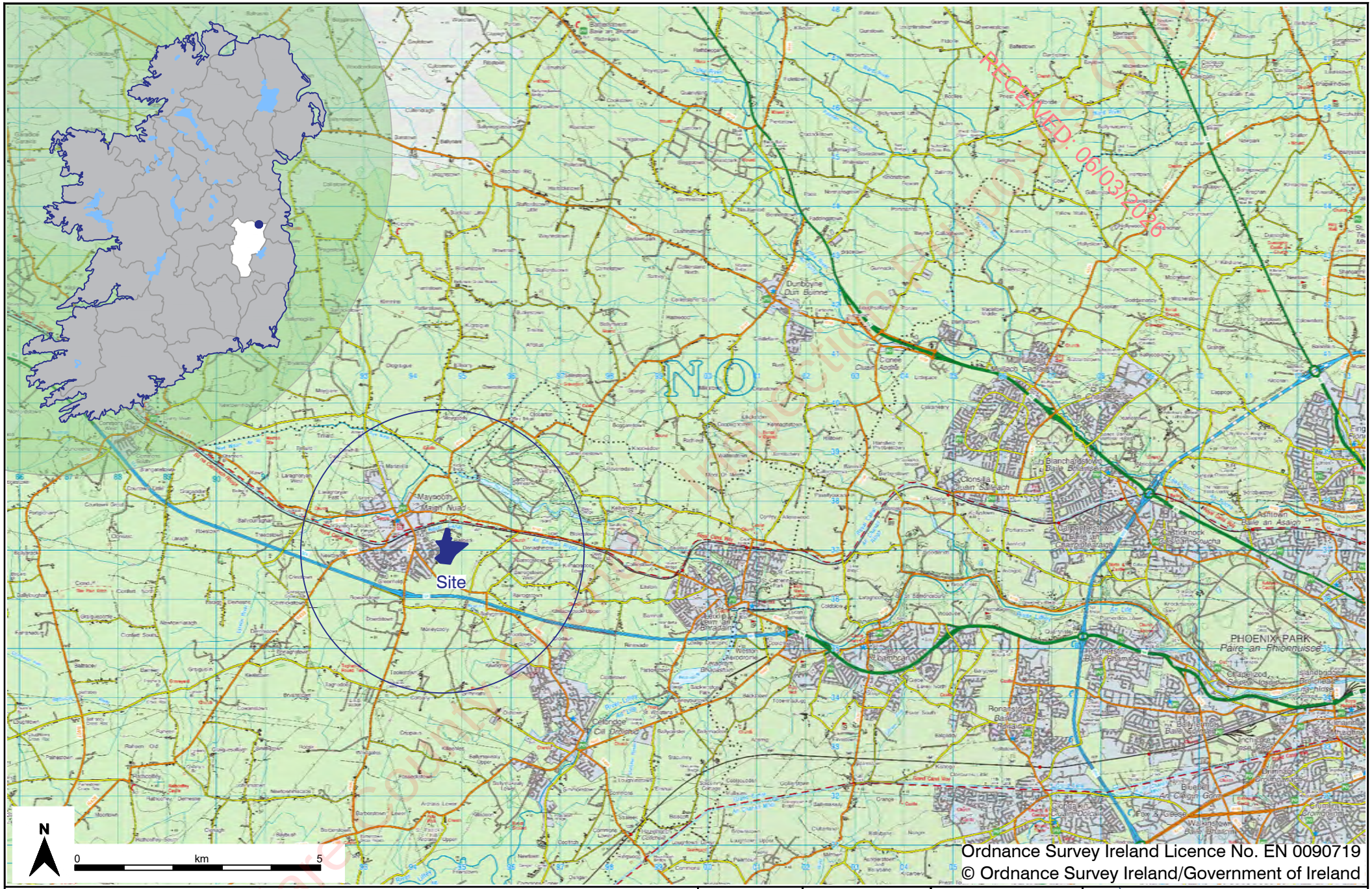
A possible masonry structure was identified at the west end of Trench 45. The feature is circular in plan and constructed with stone and lime mortar, with an interior fill of grey clay and lime mortar. It likely represents the remains of an 18th/19th-century lime kiln.

Four human inhumation burials, a ring-ditch with a possible extension and a second possible ring-ditch were identified in the northeast end of Trench 53. Burial 1 consisted of the outline of a possible grave cut filled with dark clay and was identified within a ring-ditch. The ditch is filled with fine orange-brown clay, measures c. 0.80–1.10m in width and is 6m in internal diameter. A north–south extension cut filled with a similar orange-brown clay was identified to the north of this ring-ditch, stopping just short of Burial 2. Burial 2 is aligned east–west and filled with a dark brown clay. Burial 3 is to the immediate east of Burial 2 and extends under the east baulk of the extension to Trench 53. The grave cut was filled with a dark brown clay with human bone evident in the fill. Burial 4 was identified to the immediate west of Burials 2 and 3, and is filled with a dark brown clay with human bone. A curvilinear feature, perhaps representing another ring-ditch, was also found in Trench 53, to the southwest of the above ring-ditch. This feature was circular in plan and extended southwards from the baulk of the trench. It was represented by a brown clay with frequent charcoal, with a ditch that measures c. 0.60m in width and has an internal diameter of c. 1.50m.

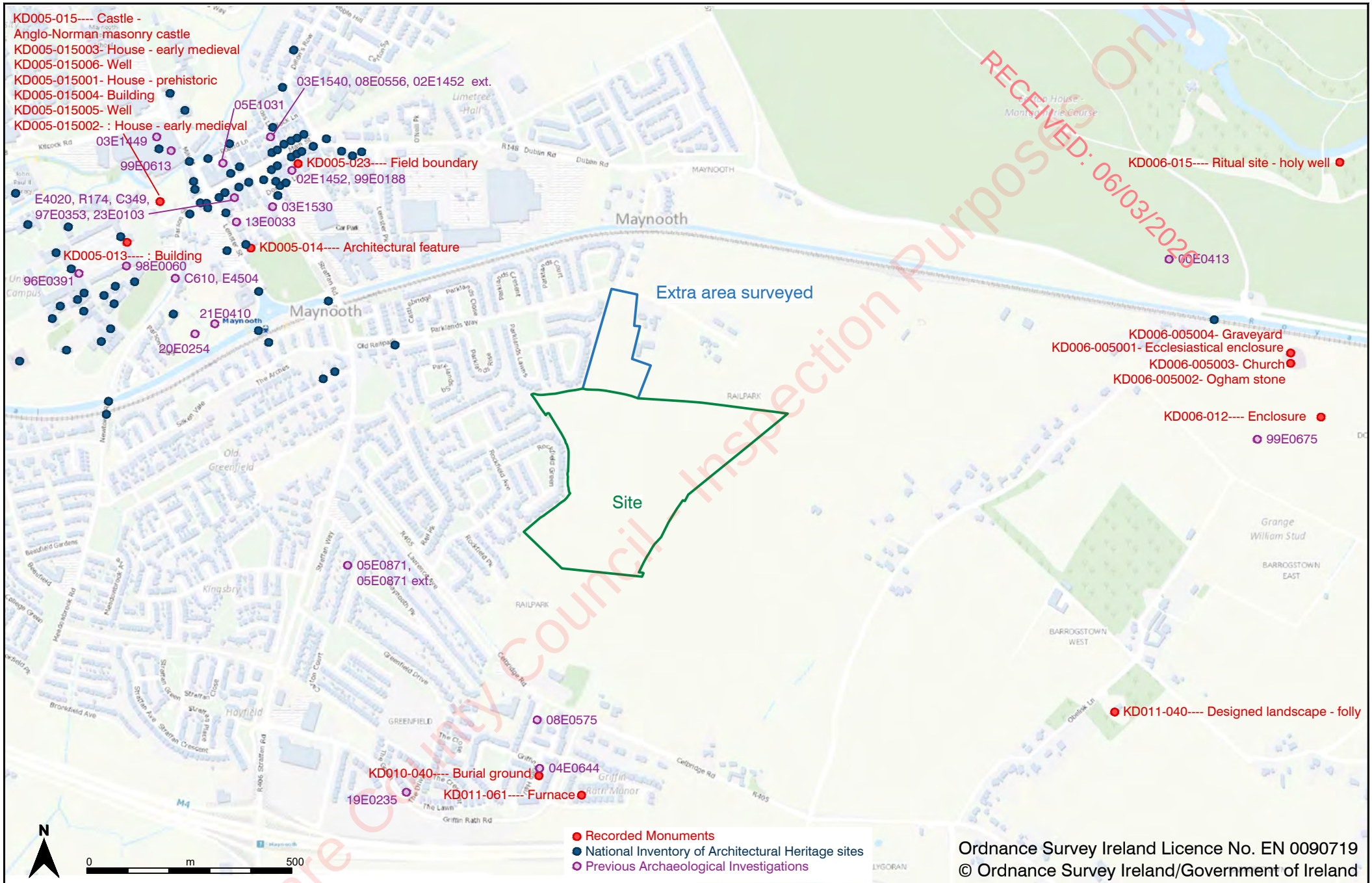
Due to the significance of the features found in Trenches 43, 45, and 53, the proposed development will have an impact on the archaeology in these parts of the site. Therefore, it is recommended that these features be investigated and persevered by record (fully excavated by hand) before any further works are carried out in these areas of the site. It is also recommended that any topsoil stripping of the site is monitored by an archaeologist, including the northeast area (east of the MERR) that was not accessible during these test excavations. Both excavation and monitoring must be carried out by a suitably qualified archaeologist working under licence from the Department of Housing, Local Government and Heritage. Archaeological material identified during monitoring may

necessitate further mitigation, including preservation in situ (avoidance) or preservation by record (excavation) following consultation with the National Monuments Service.

Signed:		**Date:**	**19/01/2026**

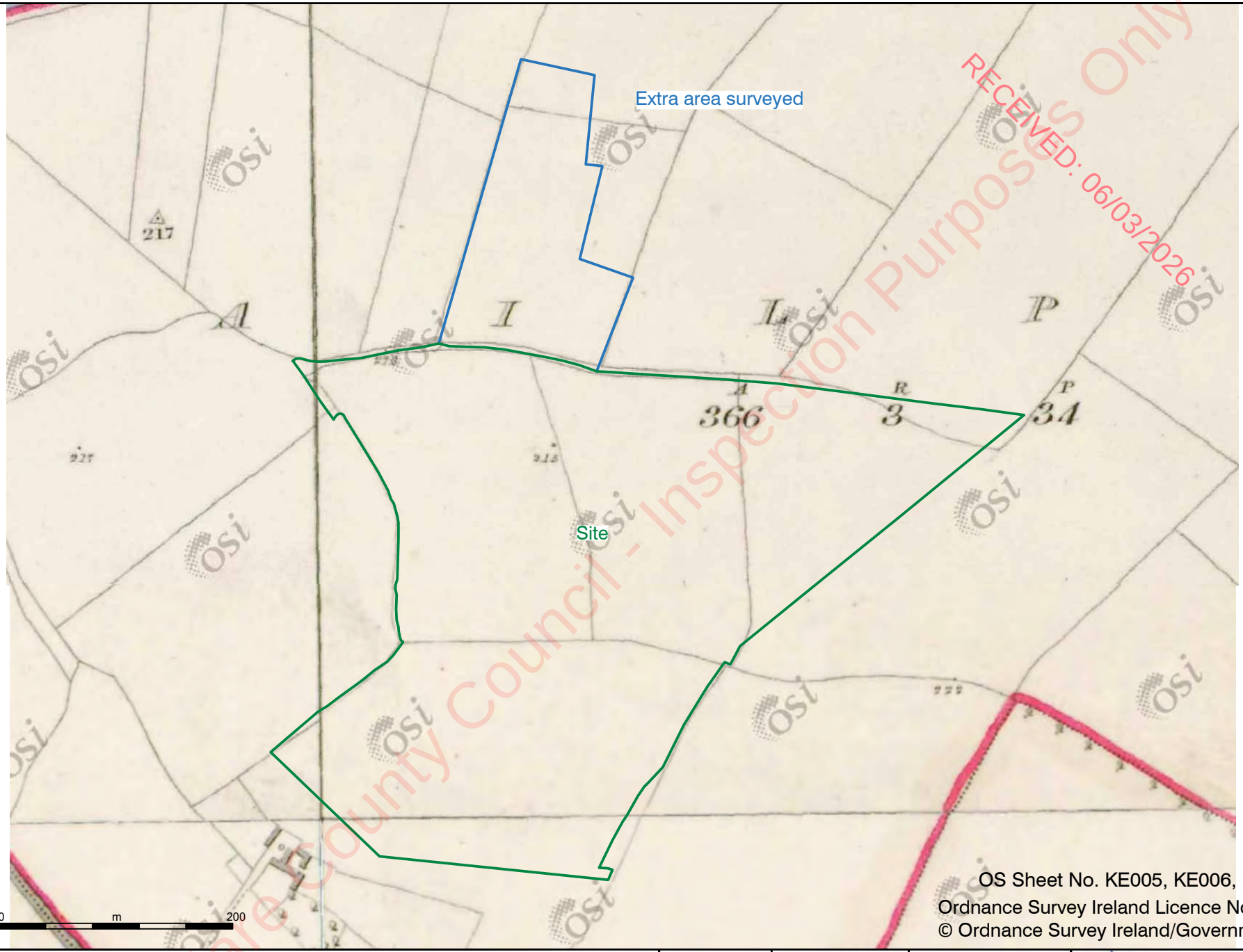


Project	Railpark, Maynooth, Co. Kildare	**Drawn by** C.M.	**Date** January 2026	**Drawing No.** 24156_C1011	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 1	Location of site			**Scale** 1:100,000 @ A4	



Project Railpark, Maynooth, Co. Kildare		**Drawn by** C.M.	**Date** January 2026	**Drawing No.** 24156_C1012
Figure 2 Location of site, previous archaeological investigations and nearby *Sites and Monuments Record* sites				**Scale** 1:12,000 @ A4

ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT



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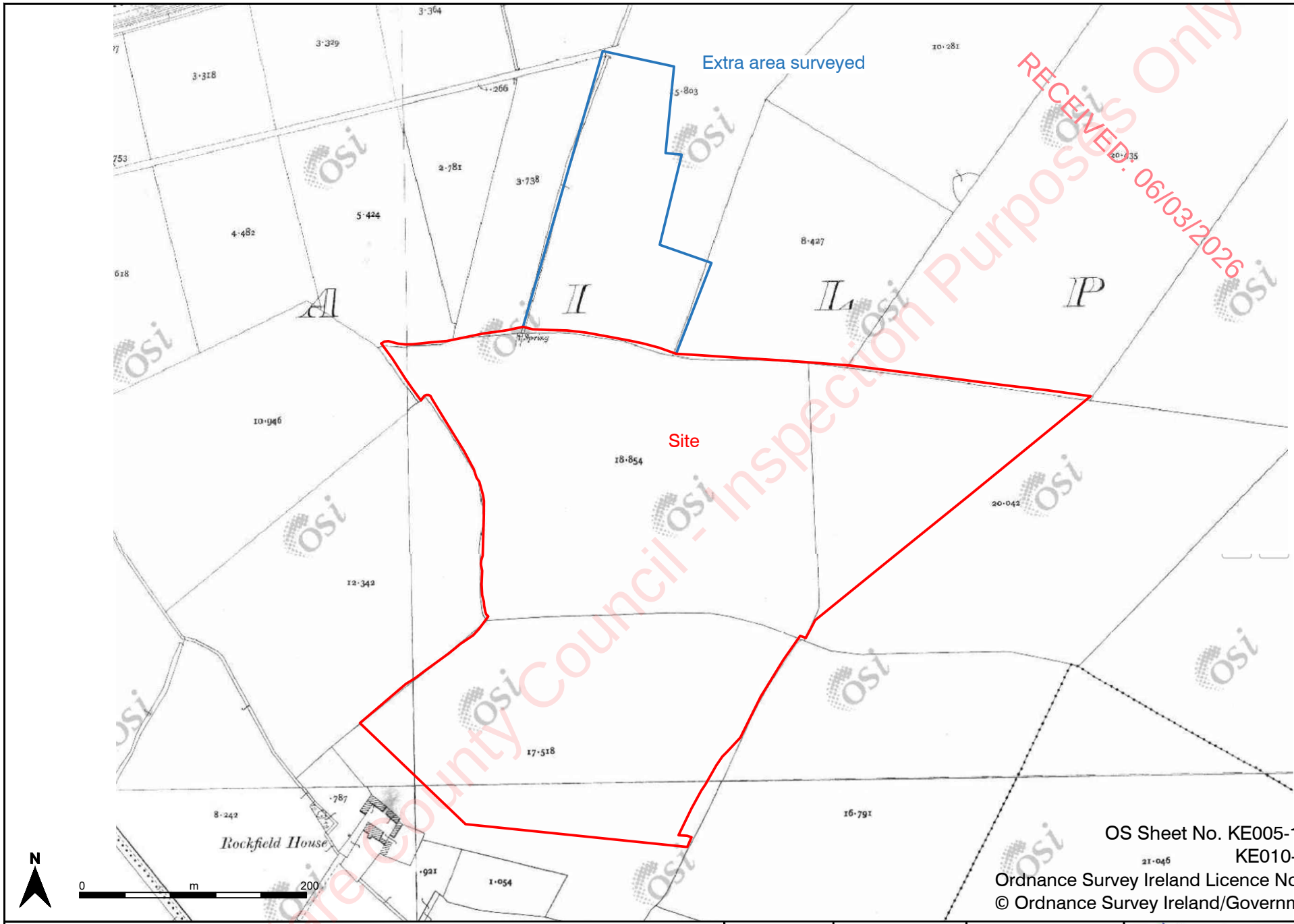
Project Railpark, Maynooth, Co. Kildare	**Drawn by** C.M.	**Date** January 2026	**Drawing No.** 24156_C1013	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 3 Extract from 1st edition Ordnance Survey (OS) 6-inch map (surveyed 1835 - published 1837), showing location of site			**Scale** 1:4,500 @ A4	



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Project Railpark, Maynooth, Co. Kildare		**Drawn by** C.M.	**Date** January 2026	**Drawing No.** 24156_C1014
Figure 4 Extract from 3rd edition Ordnance Survey (OS) 25-inch map (surveyed 1908-09 - published 1910), showing location of site				**Scale** 1:4,500 @ A4

ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT

Project Railpark, Maynooth, Co. Kildare	**Drawn by** C.M.	**Date** January 2026	**Drawing No.** 24156_C1015	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 5 Aerial view of site			**Scale** 1:4,000 @ A4	

Project Railpark, Maynooth, Co. Kildare	**Drawn by** C.M.	**Date** January 2026	**Drawing No.** 24156_C1016	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 6 Aerial view of site, showing geophysical survey results (greyscale images)			**Scale** 1:4,000 @ A4	

Project Railpark, Maynooth, Co. Kildare		**Drawn by** C.M.	**Date** January 2026	**Drawing No.** 24156_C1017
Figure 7 Aerial view of site, showing geophysical survey interpretation, trenches and identified features				**Scale** 1:4,000 @ A4

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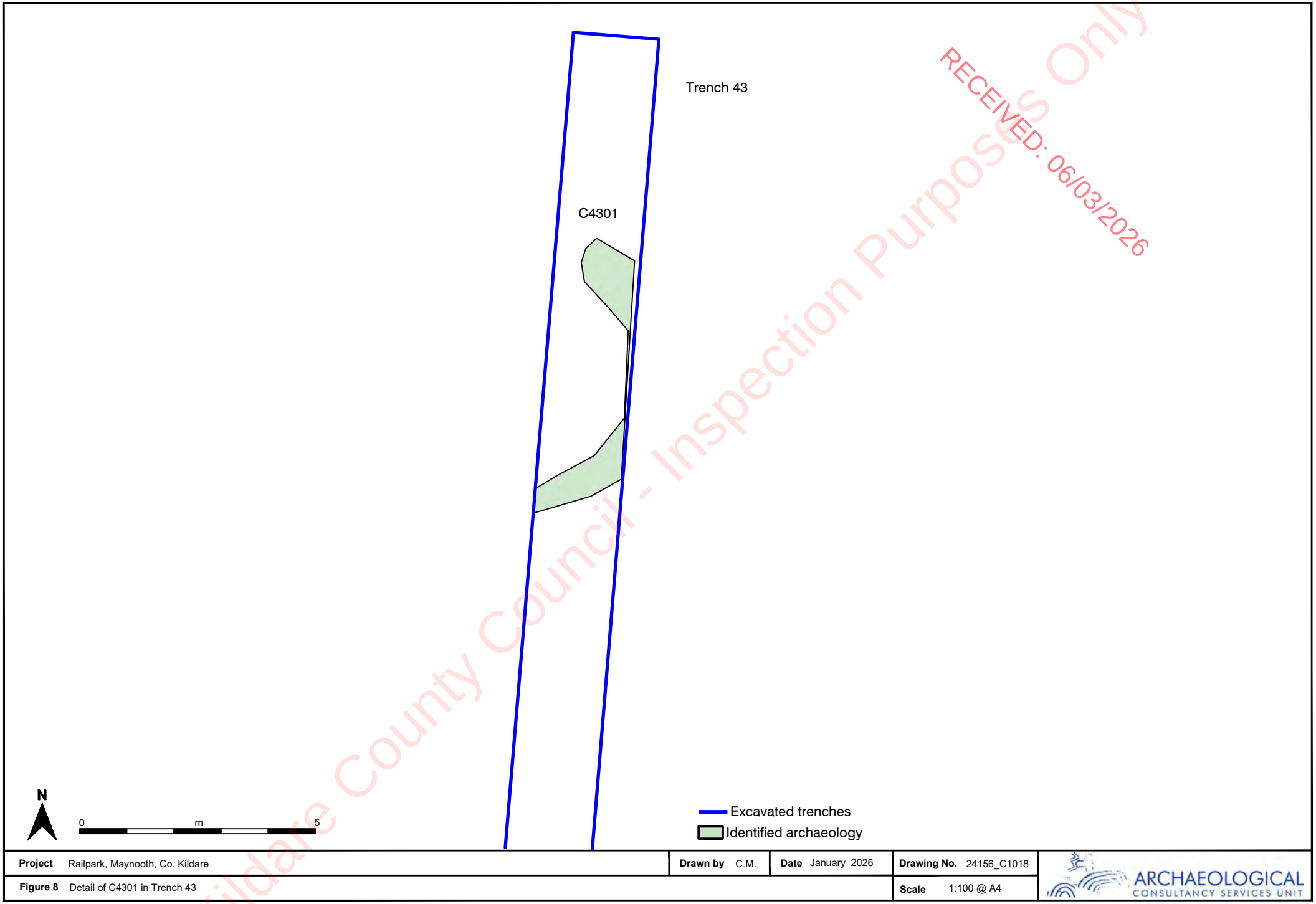

Project Railpark, Maynooth, Co. Kildare		**Drawn by** C.M.	**Date** January 2026	**Drawing No.** 24156_C1018
Figure 8 Detail of C4301 in Trench 43				**Scale** 1:100 @ A4

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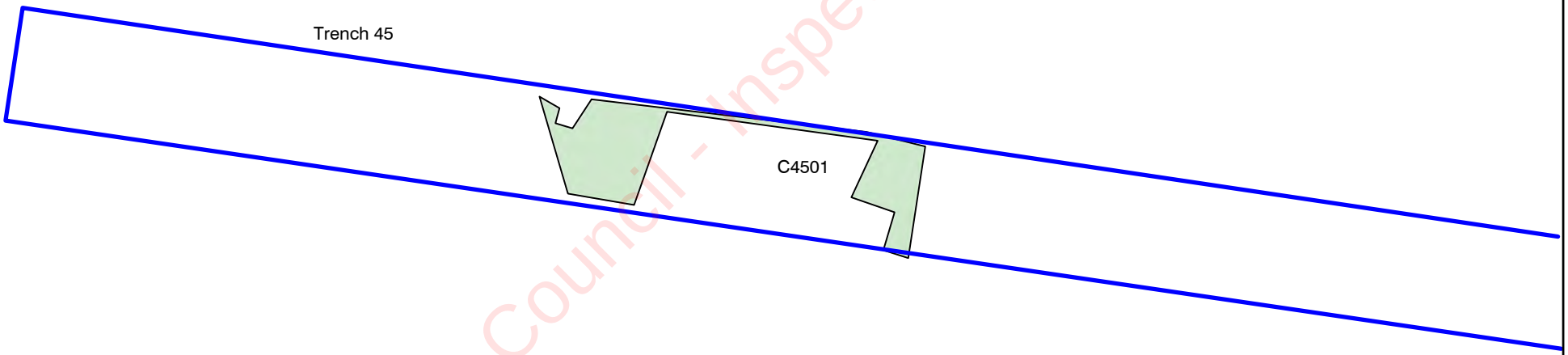

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Excavated trenches

Identified archaeology

Project Railpark, Maynooth, Co. Kildare		**Drawn by** C.M.	**Date** January 2026	**Drawing No.** 24156_C1019
Figure 9 Detail of C4501 in Trench 45				**Scale** 1:100 @ A4

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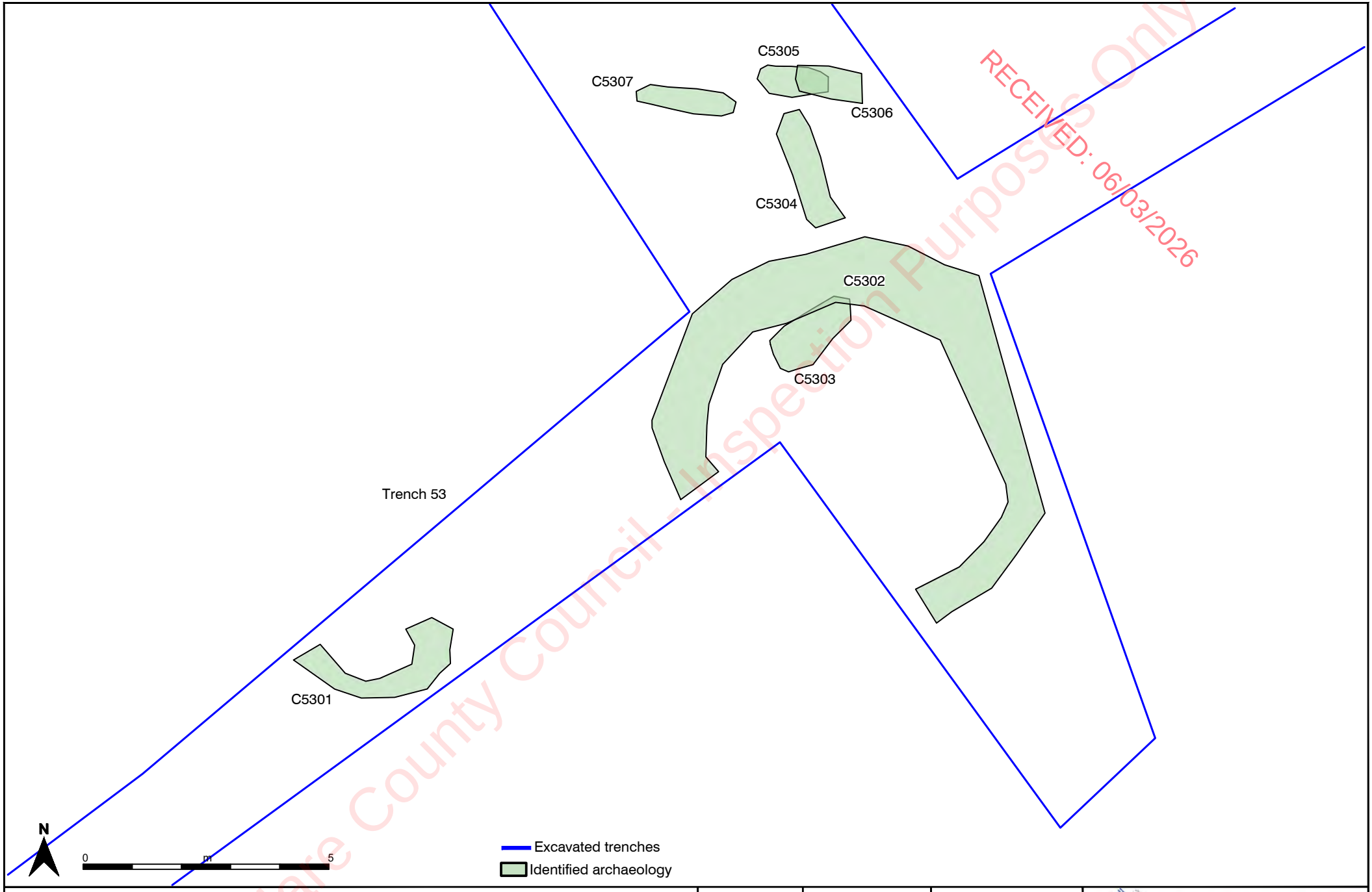


Project Railpark, Maynooth, Co. Kildare		**Drawn by** C.M.	**Date** January 2026	**Drawing No.** 24156_C1020
Figure 10 Detail of C5301, C5302, C5303, C5304, C5305, C5306, C5307 in Trench 53				**Scale** 1:100 @ A4

ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT

Project Railpark, Maynooth, Co. Kildare	**Drawn by** C.M.	**Date** January 2026	**Drawing No.** 24156_C1021	ARCHAEOLOGICAL CONSULTANCY SERVICES UNIT
Figure 11 Detail of site development, showing geophysical survey interpretation, trenches and identified features			**Scale** 1:4,000 @ A4	

Plate 1: Trench 1, looking northwest

Plate 2: Trench 2, looking northeast

Plate 3: Trench 3, looking northeast

Plate 4: Trench 4, looking north

Plate 5: Trench 5, looking northeast

Plate 6: Trench 6, looking northwest

Plate 7: Trench 7, looking southwest

Plate 8: Trench 8, looking west

Plate 9: Trench 9, looking northwest

Plate 10: Trench 10, looking southeast

Plate 11: Trench 18, looking north

Plate 12: Trench 19, looking northeast

Plate 13: Trench 20, looking west

Plate 14: Trench 21, looking south

Plate 15: Trench 22, looking northeast

Plate 16: Trench 24, looking northeast

Plate 17: Trench 25, looking north

Plate 18: Trench 26, looking southeast

Plate 19: Trench 27, looking north

Plate 20: Trench 28, looking northeast

Plate 21: Trench 29, looking northwest

Plate 22: Trench 30, looking west

Plate 23: Trench 31, looking southwest

Plate 24: Trench 32, looking southeast

Plate 25: Trench 33, looking north

Plate 26: Trench 34, looking north

Plate 27: Trench 35, looking northeast

Plate 28: Trench 36, looking southwest

Plate 29: Trench 37, looking north

Plate 30: Trench 38, looking north

Plate 31: Trench 38, looking northwest, showing the outline of a modern ditch with tree roots in the fill

Plate 32: Trench 39, looking south

Plate 33: Trench 40, looking north

Plate 34: Trench 41, looking northwest

Plate 35: Trench 42, looking northwest

Plate 36: Trench 43, looking south

Plate 37: Trench 43, showing possible ring-ditch (C4301), looking northeast

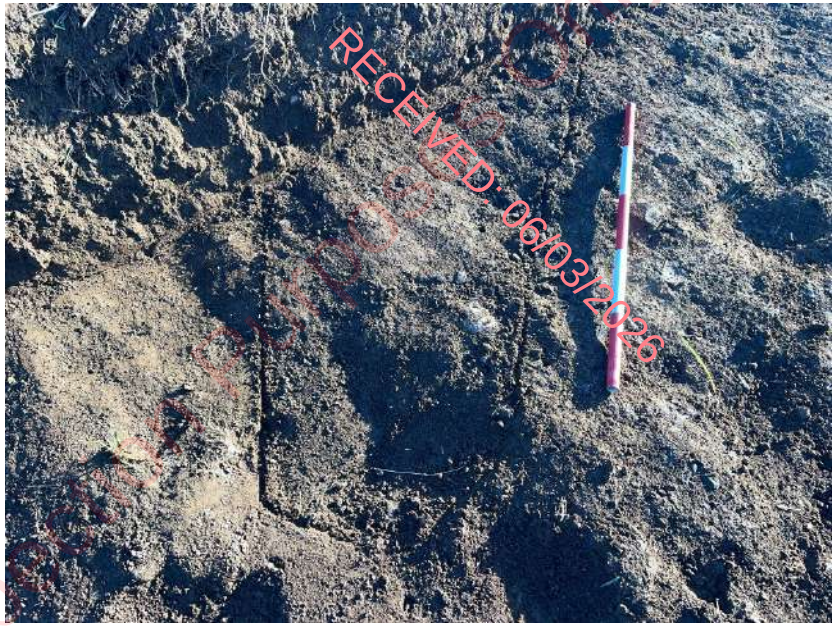


Plate 38: Trench 43, showing possible ring-ditch (C4301), looking southeast

Plate 39: Trench 44, looking northwest

Plate 40: Trench 45, looking west

Plate 41: Trench 45, showing possible masonry structure (C4501), looking east

Plate 42: Trench 45, showing possible masonry structure (C4501), looking southeast

Plate 43: Trench 45, showing possible masonry structure (C4501), looking west

Plate 44: Trench 45, showing possible masonry structure (C4501), looking northwest

Plate 45: Trench 46, looking southeast

Plate 46: Trench 47, looking southwest

Plate 47: Trench 48, looking southwest

Plate 48: Trench 49, looking southwest

Plate 49: Trench 50, looking southwest

Plate 50: Trench 51, looking west

Plate 51: Trench 52, looking northeast

Plate 52: Trench 53, looking northeast

Plate 53: Trench 53, showing curvilinear feature (C5301), looking north

Plate 54: Trench 53, showing internal diameter of curvilinear feature (C5301), looking southeast

Plate 55: Trench 53, showing ring-ditch (C5302), looking northwest

Plate 56: Trench 53, showing ring-ditch (C5302), looking south

Plate 57: Trench 53, showing Burial 1 (C5303), looking northeast

Plate 58: Trench 53, showing ring-ditch (C5302) in foreground and possibly related extension cut (C5304), looking west

Plate 59: Trench 53, showing Burial 2 (C5305), looking west

Plate 60: Trench 53, showing in situ human bone on the surface fill of Burial 2 (C5305), looking west

Plate 61: Trench 53, showing Burial 3 (C5306), looking west

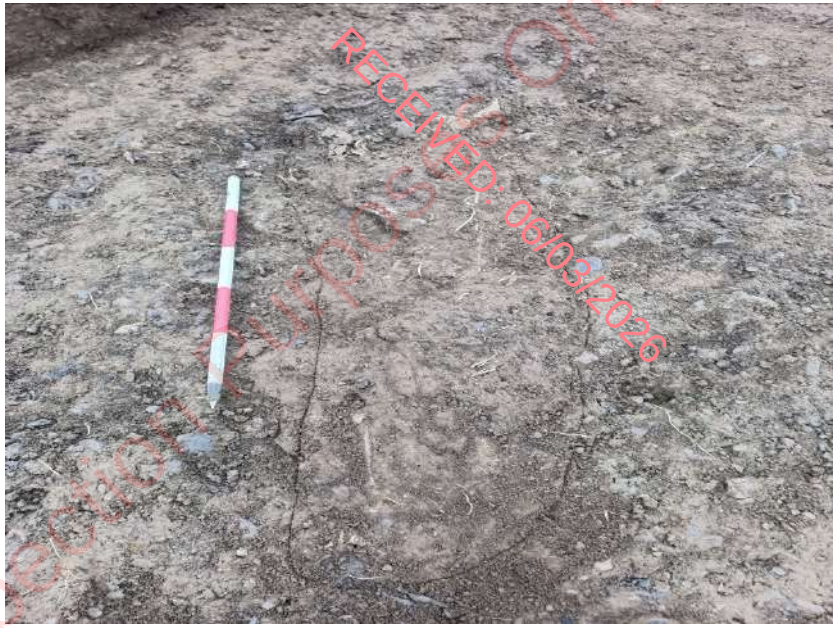


Plate 62: Trench 53, showing Burial 4 (C5307), looking west

Plate 63: Trench 54, looking southeast

Plate 64: Trench 55, looking southwest

Plate 65: Location of Trench 56, unexcavated due to presence of modern sewer line

Plate 66: Trench 57, looking southeast

Plate 67: Trench 58, looking southeast

Plate 68: Trench 59, looking northwest

Plate 69: Trench 60, looking southeast

APPENDIX 3:

CHAPTER 11

CLIMATE

11.0 CLIMATE

This Chapter has been revised and updated to take account of the matters raised under Item 11 of the Request for Further Information issued by Kildare County Council dated 25th November 2025 in respect to KCC Reg. Ref.: 25/61119, and any associated amendments arising out of the FI request.

11.1 INTRODUCTION

This chapter of the EIAR identifies, describes, and presents an assessment of the eventual significant direct and indirect effects of the Proposed Development at Lands at Railpark, Maynooth, Co. Kildare on climate (for example greenhouse gas emissions) and its vulnerability to climate change.

It should be read in conjunction with Ch10. Air Quality, Ch14. Material Assets, Ch13, Traffic and Transport, Flood Risk Assessment and the Traffic and Transport Assessment, as well as the Energy Analysis Report, Building Life Cycle Assessment Report and Site-Specific Flood Risk Assessment submitted with the planning application. The daylight and sunlight assessment and microclimate / wind assessment of the proposed development is a separate matter to the EIAR and is addressed in standalone reports prepared by GIA accompanying the application.

The Proposed Residential Development as revised at FI Stage will provide a total of 589 no. residential units, consisting of 220 no. apartment / duplex units and 369 no. houses.

The proposed neighbourhood centre is arranged in a 5 storey block and a part 6 storey block with a new public plaza and includes a range of community and commercial uses, comprising a childcare facility (762 sq.m), health centre (201 sq.m), and two no. Class 1- Shop units (124 sq.m) and (141 sq.m).

A total of 888 no. car parking spaces are proposed, which includes 711 no. in-curtilage spaces for houses, 115 no. spaces for the duplex apartments / apartments, 14 no. for the commercial uses at the neighbourhood centre, 12 no. spaces for the staff of the childcare facility and 36 no. visitor spaces for residents. A total of 590 no. cycle spaces are proposed for residents, 41 no. spaces for the neighbourhood centre uses and 110 no. visitor cycle parking spaces.

The proposal includes hard and soft landscaping, lighting, boundary treatments, communal open space, public open space including a Local Park and Pocket Parks, children's play areas and an ancillary play area for the childcare facility.

The Proposed Development provides for access from the permitted Maynooth Eastern Ring Road (MERR), including a new pedestrian/cyclist signalised crossing, associated internal roads, pedestrian and cycle paths and access points provided up to the application site boundary to provide for potential future connections to adjoining lands to the north and south, subject to agreement with the Planning Authority / adjacent landowner.

The development includes foul and surface water drainage, 6 no. ESB Substations, services and all associated and ancillary site works and development. A full description of the development can be found in Chapter 2.

Climate change is recognised as one of the most serious global environmental problems and arguably the greatest challenge facing humanity today. While natural variations in climate over time are normal, anthropogenic activities have interfered greatly with the global atmospheric system by emitting substantial amounts of greenhouse gases (GHGs). This has caused a discernible effect on our global climate system, with continued change expected due to current and predicted trends of GHG emissions. In Ireland this is demonstrated by rising sea levels, changes in the ecosystem, and extreme weather events.

The assessment examines the potential impacts during the construction and operational phases of the Proposed Project. This chapter should be read in conjunction with the following chapters, which present related impacts arising from the proposed Project:

- Chapter 2 Project Description;
- Chapter 7 Land and Soils;
- Chapter 9 Water (Including Hydrology and Flood Risk);
- Chapter 10 Air Quality;
- Chapter 13 Traffic and Transportation and
- Chapter 14 Material Assets

Attention will be focused on Ireland's obligations under the Paris Agreement in the context of the overall climatic impact of the presence and absence of the Proposed Development.

11.1.1 Quality Assurance and Competency of Experts

This chapter was prepared by Aoife Gillen, Principal Sustainability Consultant, DNV consulting. Aoife has a Master of Science (hons) degree. Aoife has worked as a Sustainability Consultant with DNV since 2024 and has built up experience preparing climate change impact assessments, environmental impact assessment (EIA) screening reports, air quality and climate, scheme sustainability statements and climate action and sustainability statements for clients.

11.1.2 Greenhouse Gas Emissions in Ireland

Ireland's latest greenhouse gas (GHG) emissions 1990-2023 are based on the Sustainable Energy Authority Ireland's (SEAI's) provisional energy balance released in May 2025 (EPA, 2025). In 2023, Ireland's GHG emissions are estimated to be 58.82 million tonnes carbon dioxide equivalent (Mt CO_2eq), which is 6.1% lower (or 3.79 Mt CO_2eq) than emissions in 2022 (62.26 Mt CO_2eq) and follows a 3.0% decrease in emissions reported for 2022. Emissions are 3.3% below the historical 1990 baseline for the first time in 33 years.

Arresting growth in emissions is a challenge in the context of a growing economy but one which must continue to be addressed by households, business, farmers and communities if Ireland is to reap the benefits of a low-carbon economy.

The final greenhouse gas emission inventory for 2023 is the third of ten years over which compliance with targets set in the European Union's Effort Sharing Regulation (EU 2018/842) will be assessed. This Regulation sets 2030 targets for emissions outside of the Emissions Trading Scheme (known as ESR emissions) and annual binding national limits for the period 2021-2030. Ireland's target is to reduce its greenhouse gas emissions by at least 42% by 2030 compared with 2005 levels, with a number of

flexibilities available to assist in achieving this. The ESR includes the sectors outside the scope of the EU Emissions Trading System (ETS) (such as Agriculture, Transport, Residential, Public Services and Commercial Services and Waste).

Ireland's ESR emissions annual limit for 2023 is 40.52 Mt CO_2eq. Ireland's final 2023 greenhouse gas ESR emissions are 42.74 Mt CO_2eq, this is 2.22 Mt CO_2eq more than the annual limit for 2023. This value is the national total emissions less emissions generated by stationary combustion i.e. power plants, cement plants, and domestic aviation operations that are within the EU's emissions trading scheme. Cumulatively from 2021-2023 and after using the ETS flexibility, Ireland is in compliance with the ESR by a net distance to target of 0.22 Mt CO_2eq, although in 2023 there is an exceedance of 0.29 Mt CO_2eq above its Annual Emissions Allocation with the ETS flexibility. Agriculture and Transport accounted for 75.9% of total ESR emissions in 2023. The revised LULUCF Regulation (2023) incorporates new rules around LULUCF flexibilities for the period 2021-2025 and 2026-2030. There is a high degree of uncertainty relating to the availability of the LULUCF flexibility and, if available, the quantity of flexibility in each budgetary period.

The latest projections (May 2025) indicate that currently implemented measures (With Existing Measures) will achieve a reduction of 10% on 2005 levels by 2030, significantly short of the 42% reduction target. If measures in the higher ambition (With Additional Measures) scenario are implemented, EPA projections show that Ireland can achieve a reduction of 22% by 2030, still short of the 42% reduction target.

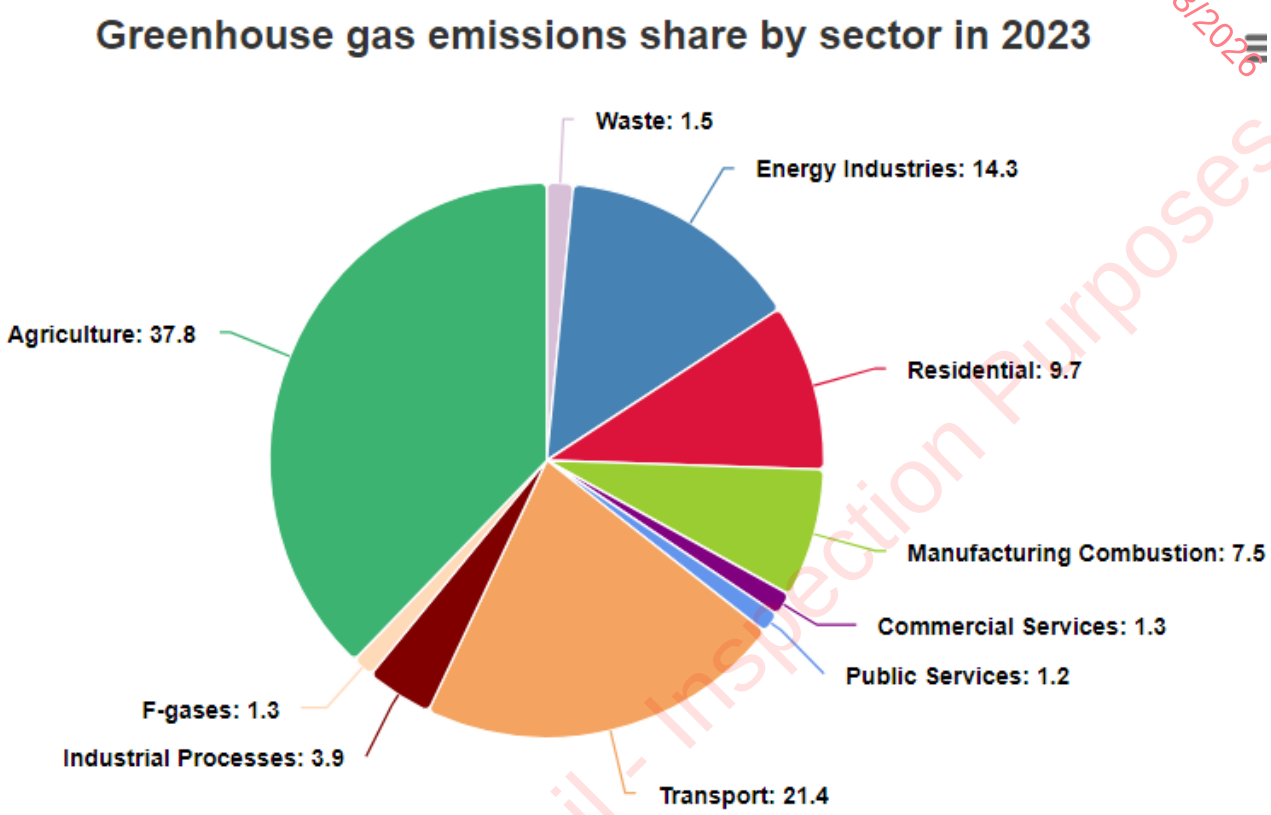
In terms of the 2030 targets, the ESR provides two flexibilities (use of ETS allowances and credit from action undertaken in the land use, land use change and forestry (LULUCF) sector) to allow for a fair and cost-efficient achievement of the targets. New Regulations in 2023 mean there are new rules around LULUCF flexibility that incorporates split budgets 2021-2025 to 2026-2030[1]. Additional analyses are needed to estimate the impact of the new rules on flexibilities. In the interim, based on latest LULUCF inventory and projections data, the maximum amount of LULUCF flexibility now projected to be available is 13.4 Mt CO_2eq in the first 5-year period (or 2.68 Mt CO_2eq per annum), with no flexibility available in the second 5-year period.

Ireland's greenhouse gas (GHG) emissions increased in the period from 1990 to 2001 where it peaked at 70.85 Mt CO_2 equivalent, before displaying a downward trend to 2014. Emissions increased by 4.0% and 3.8%, respectively in the years, 2015 and 2016 and remained relatively stable in 2017 and 2018, followed by a 3.0% decrease in 2019. In 2020 total national GHG emissions were 3.6% lower than 2019 emissions largely driven by the covid restrictions. The gradual lifting of covid restrictions in 2021 along with an increase in the use of coal and less renewables within electricity generation resulted in a 4.5% increase in emissions in 2021 compared to 2020. A 2.1% decrease in emissions was seen in 2022 compared to 2021, mainly due to a substantial decrease in residential sector emissions combined with decreases from industry, agriculture and electricity generation. This was followed by a 6.8% reduction in emissions in 2023. Ireland's GHG emissions have decreased by 3.3% from 1990-2023.

In relation to the greenhouse gases; carbon dioxide (CO_2) accounted for 61.1% of the total, with methane (CH_4) and nitrous oxide (N_2O) contributing 28.9% and 8.8% as CO_2 equivalent, respectively and F-gases contributing 1.2% of the total as CO_2 equivalent.

In 2023, the energy industries, transport and agriculture sectors accounted for 73.5% of total GHG emissions. Agriculture is the single largest contributor to the overall emissions, at 37.7%. Transport, energy industries and the residential sector are the next largest contributors, at 21.5%, 14.3% and 9.7%, respectively.

Figure 11.1: Ireland's Greenhouse Gas Emissions Share by Sector 2023 (Source: EPA, 2024)



The Climate Change Advisory Council submitted their Annual Review 2023 to the Minister of the Environment, Climate and Communications on 24th of June 2024. Detailed key messages, including observations and recommendations for each sector (electricity; transport; built environment; enterprise and waste; agriculture, forestry and other land use; and biodiversity), can be found at the beginning of each chapter in the annual review (CCAC, 2024). The overall recommendations are as follows:

- The Council strongly recommends that the Government urgently conducts a full review of taxation in the Transport sector (including vehicle registration tax, motor tax, excise duty, carbon tax, fuel pricing and distance-based charges) to ensure that taxation policy for households and businesses supports emission targets, is aligned with climate objectives, promotes energy efficiency and minimises negative impacts on society.
- Government and local authorities should reallocate road space to provide better access for more sustainable modes of transport, such as walking, cycling or taking a bus. Public transport services need to improve, and more public engagement is needed to understand the barriers people face in making sustainable transport choices.
- The Government must urgently complete the planning reform necessary to:

  - ensure that new developments reduce transport demand by placing homes, workplaces, public services and leisure spaces closer to each other and nearer to public and active transport (e.g. walking and cycling) infrastructure,
  - speed up the delivery of major public and active transport infrastructure projects and minimise the costs and delays associated with the planning process.
- Local authorities must have the support and guidance from Government that they need to reduce transport demand and emissions, with locally implemented measures such as low-emission zones and provision of shuttle bus services or incentives to promote carpooling.
- The number of car journeys to and from schools needs to be reduced by significantly expanding the School Transport Scheme and continuing work to increase the number of pupils walking and cycling to school.
- The Government needs to prioritise measures and investments to strengthen the resilience of ports and critical roads and railways to the future impacts of climate change such as more intense rainfall events and sea level rise.

11.1.3 Legislation, Policy and Guidance

The key legislation and guidance referenced in the preparation of the EIAR is outlined in Chapter 1: Introduction. Specific to Climate, the following legislation, guidance, and planning framework relevant to the consideration of this factor has informed the assessment as outlined below.

11.1.3.1 International Legislation/Commitments/Agreements

In March 1994, the United Nations Framework Convention on Climate Change (UNFCCC) was established as an intergovernmental effort to tackle the challenges posed by climate change. The Convention membership is almost universal, with 197 countries having ratified. Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices. This information is then utilised to launch national strategies and international agreements to address GHG emissions. Following the formation of the UNFCCC, two major international climate change agreements were adopted: The Kyoto Protocol, and the Paris Agreement.

In April 1994, Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) and subsequently signed the Kyoto Protocol in 1997. The Kyoto Protocol is an international agreement linked to the UNFCCC which commits its parties to legally binding emission reduction targets. In order to ensure compliance with the protocol, the Intergovernmental Panel on Climate Change (IPCC) has outlined detailed guidelines on compiling National Greenhouse Gas Inventories. These are designed to estimate and report on national inventories of anthropogenic GHG emissions and removals. Under Article 4 of the Kyoto Protocol, Ireland agreed to limit the net anthropogenic growth of the six named GHGs to 13% above the 1990 level, spanning the period 2008 to 2012 (IPPC, 2006).

The second commitment period of the Kyoto Protocol was established by the Doha amendment which was adopted in extremis on the 8th of December 2012, to impose quantified emission limitation and reduction commitments (QELRCs) to Annex I (developed country) Parties during a commitment period from 2013 to 2020. 38 developed countries, inclusive of the EU and its 28 member states, are participating. Under the Doha amendment, participating countries have committed to an 18% reduction in emissions from 1990 levels. The EU has committed to reducing emissions in this period to 20% below 1990 levels. Ireland's QELRCs for the period 2013 to 2020 is 80% of its base year emissions. Ireland's

compliance with the Doha amendment will be assessed based on the GHG inventory submission in 2022 for 1990-2020 data. As of October 2020, the Doha Amendment has received the required number of ratifications to enter into force. Once in force, the emission reduction commitments of participating developed countries and economies in transition (EITs) become legally binding.

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs are integrated—that is, they recognise that action in one area will affect outcomes in others, and that development must balance social, economic, and environmental sustainability. The creativity, knowhow, technology and financial resources from all of society is necessary to achieve the SDGs in every context. At its heart, the SDGs are about global partnership for this call to action. No matter how large or small, and regardless of their industry, all companies can contribute to the SDGs through their sustainability and corporate social responsibility strategies, policies, and processes.

Figure 11.2: UN Sustainable Development Goals

(Source: THE 17 GOALS | Sustainable Development)

Ireland has published a Sustainable Development Goals National Implementation Plan 2022-2024 to provide a whole-of-government approach to implementing these goals. Sustainable development, climate change and equity are intrinsically intertwined. Climate change impacts can be linked in one way or another to all 17 of the UN Sustainable Development Goals (SDGs). Climate action that considers co-impacts across other SDGs can increase efficiency, reduce costs and support early and ambitious climate action (DECC, 2022).

11.1.3.2 European Legislation

GHG Legislation

In December 2015, the Paris Climate Change Conference (COP21) took place and was an important milestone in terms of international climate change agreements. The Paris Agreement sets out a global action plan to put the world on track to mitigate dangerous climate change by setting a global warming limit not to exceed 2°C above pre-industrial levels, with efforts to limit this to 1.5°C. As a contribution to the objectives of the agreement, countries have submitted national climate action plans (nationally determined contributions, (NDCs)). Under this agreement, governments agreed to come together every 5 years to assess the collective progress towards the long-term goals and inform Parties in updating and enhancing their nationally determined contributions. Ireland will contribute to the Paris Agreement through the NDC tabled by the EU on behalf of Member States in 2020, which commits to a 55% reduction in EU-wide emissions by 2030 compared to 1990. This is considered to be the current NDC maintained by the EU and its Member States under Article 4 of the Paris Agreement.

The EU has set itself targets for reducing its GHG emissions progressively up to 2050, these are outlined in the 2020 climate and energy package and the 2030 climate and energy policy framework. These targets are defined to assist the EU in transitioning to a low-carbon economy, as detailed in the 2050 low carbon roadmap. The 2020 package is a set of binding legislation to ensure that the EU meets its climate and energy targets for the year 2020 (EEA; 2020). There are three key targets outlined in the package which were set by the EU in 2007 and enacted in legislation in 2009:

- 20% reduction in GHG emissions from 1990 levels;
- 20% of EU energy to be from renewable sources; and
- 20% improvement in energy efficiency.

The 2030 climate and energy framework builds on the 2020 climate energy package and was adopted by EU leaders in October 2014. The framework sets three key targets for the year 2030:

- At least 40% cuts in GHG emissions from 1990 levels;
- At least 32% share for renewable energy; and
- At least 32.5% improvement in energy efficiency.

The EU has acted in several areas in order to meet these targets, including the introduction of the Emissions Trading System (ETS). The ETS is the key tool used by the EU in cutting GHG emissions from large-scale facilities in the power, industrial, and aviation sectors. Around 45% of the EU's GHG emissions are covered by the ETS.

As part of the European Green Deal, the EU Commission proposed in September 2020 to raise the 2030 greenhouse gas emission reduction target, including emissions and removals, to at least 55% compared to 1990. The European Climate Law came into force in July 2021 and writes into law the goal set out in the European Green Deal for Europe's economy and society to become climate-neutral by 2050. The law also sets the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.

11.1.3.3 National Legislation

Climate Action and Low Carbon Development Act

The Climate Action and Low Carbon Development Act 2015 (the principal act) set national climate policy on a statutory footing for the first time in Ireland, with the target of pursuing the transition to a low-carbon, climate-resilient, and environmentally sustainable economy by 2050. The principal act was subsequently amended by the Climate Action and Low Carbon Development (Amendment) Act 2021 (the '2021 Act') which sets Ireland on a legally binding path to net-Zero emissions no later than 2050, and to a 51% reduction in emissions by the end of this decade (Government of Ireland; 2015).
The 2021 Act provides a legally binding framework with clear targets and commitments set in law, and ensures the necessary structures and processes are embedded on a statutory basis to ensure Ireland achieves its national, EU and international climate goals and obligations in the near and long term. Policy amendments will involve the rapid electrification of transport system: electric bikes, electric vehicles, and electric public transport. This will be enacted in tandem with a ban on new registrations of petrol and diesel cars from 2030. Furthermore, there will be a policy to incentivise behavioural changes by increased effective modal shift to walking, cycling and public transport infrastructure.

The 2021 Climate Act incorporates carbon budgets and sectoral emissions limits, defining the carbon budget as the total allowable greenhouse gas emissions during the budget period. Consequently, the Act has removed any mention of a national mitigation plan, replacing it with references to both former and latest versions of the Climate Action Plan, as well as a series of National Long Term Climate Action Strategies. Additionally, it has updated the national transition objective to a national climate objective, committing "to pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy" (Government of Ireland; 2022).

Section 6B (12) of the 2021 Climate Act requires the Minister for the Environment, Climate and Communications to publish the approved carbon budget programme. In May 2022, the budgets were published and the total emissions allowed under each budget is set out below, as well as the average annual reduction for each 5-year period (DECC, 2022):

- 2021-2025: 295 Mt CO2eq - this represents an average reduction in emissions of 4.8% per annum for the first budget period.
- 2026-2030: 200 Mt CO2eq - this represents an average reduction in emissions of 8.3% per annum for the second budget period.
- 2031-2035: 151 Mt CO2eq - this represents an average reduction in emissions of 3.5% per annum for the third provisional2 budget.

To meet these targets, the government published a set of Sectoral Emissions Ceilings in July 2022. Industry and Buildings (Residential) have a 35% and 40% reduction requirement respectively and a 2030 emission ceiling of 4 Mt CO2e.

The assessment in this chapter has been prepared in accordance with, among other things, the 2021 Act and the EIA Directive.

The 2021 Act also introduces a requirement for each local authority to prepare a Climate Action Plan, which will include both mitigation and adaptation measures and be updated every five years. Local authority Development Plans will also align with their Climate Action Plan (DECC, 2021).

The proposed project is consistent with the following plans, strategies and objectives specified in section 15 of the Climate Action and Low Carbon Development Act 2015, as amended:

- The National Climate Objective;
- The most recent Climate Action Plan;
- The most recent National Long-Term Climate Action Strategy;
- The most recent National Adaptation Framework; and
- The objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State.

The Act mandates the relevant Minister to develop the Climate Action Plan, the National Long-Term Climate Action Strategy, and the National Adaptation Framework to achieve the National Climate Objective (DECC, 2021). This objective of becoming 'climate neutral' by 2050 aligns with the EU's climate goal as established in Regulation (EU) No 2021/1119 (the 'European Climate Law'). The European Climate Law enshrines into EU legislation the target set by the European Green Deal for the EU to attain climate neutrality, or 'net zero' greenhouse gas emissions, by 2050.

The Climate Action Plan 2025 (CAP25) is the fourth annual update to Ireland's Climate Action 2019 (the plans are to be updated annually to ensure alignment with Ireland's legally binding economy-wide carbon budgets and sectoral ceilings) (DECC; 2023). This plan is the third to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings. The plan had a delayed launch on April 15th, 2025.

The plan implements the carbon budgets and sectoral emissions ceilings and sets out a roadmap for taking decisive action to halve our emissions by 2030 and reach net zero no later than 2050, as committed to in the Programme for Government. Climate Action Plan 2025 builds on Climate Action Plan 2024, outlining how Ireland will accelerate the actions required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development (DECC; 2025). Climate Action Plan 2025 is a streamlined Climate Action Plan, to be read in conjunction with Climate Action Plan 2024. It is also the final Climate Action Plan of the first 5-year Carbon Budget – marking an important midpoint in what has been called the decade of climate action.

The supplementary Annex of Actions, approved by the Irish Government, provides the specific actions required to implement the targets set out in the Plan, and includes information regarding outputs, lead departments, timelines and stakeholders. For 2025 a similar approach to the 2024 Annex has been implemented that will see only new, high-impact actions included in the Annex, while the full roadmap of actions to support the delivery of our climate targets remains within the Climate Action Plan itself (DECC; 2025).

11.1.3.4 National Policy

National Adaptation Framework (NAF)

Ireland's statutory National Adaptation Framework (NAF) was published in June 2024 and was developed under the Climate Action and Low Carbon Development Act 2015. The NAF sets out the national strategy to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts.

The NAF builds on the work already carried out under the National Climate Change Adaptation Framework (NCCAF, 2012). The NAF outlines a whole of government and society approach to climate adaptation in Ireland. It also aims to improve the enabling environment for adaptation through ongoing engagement with civil society, the private sector, and the research community.

Under the NAF, several government departments are required to prepare sectoral adaptation plans in relation to the priority areas that they are responsible for, which is to be reviewed once every five years. Local authorities are required to prepare local adaptation strategies. The NAF also aims to ensure ongoing engagement with civil society, the private sector, and the research community.

Just Transition

The 2021 Climate Action Plan sets out a just transition framework consisting of four principles to underpin both processes and implementation of all climate action policies and measures. The present report primarily examines the impact of climate change (Government; 2021). However, we recommend that due consideration be given to the concept of a "just transition," aligning with the Irish Government's framework, to ensure a comprehensive approach to addressing the climate crisis that extends beyond mere climate action.

The just transition framework is made up of four principles (DECC; 2021):

- An integrated, structured, and evidence-based approach to identify and plan our response to just transition requirements.
- People are equipped with the right skills to be able to participate in and benefit from the future net zero economy.
- The costs are shared so that the impact is equitable, and existing inequalities are not exacerbated.
- Social dialogue to ensure impacted citizens and communities are empowered and are core to the transition process.

Regional Policy

Action 8 of the National Adaptation Framework (DCCAE 2018) indicates that four regional climate offices must be established, and the Eastern & Midlands Climate Action Regional Office (CARO) is one of these offices. One of the responsibilities of the CARO is to assist local authorities within their region in preparing a Climate Change Action Plan.

11.1.3.5 Kildare Council Climate Action Plan 2024-2029

In September 2024, Kildare County Council (KCC) adopted the Kildare Council Climate Action Plan 2024-2029 (Kildare CAP). The Action Plan is the climate adaptation and mitigation strategy for the County, and sets out to achieve, by no later than the end of 2050, the transition to a climate resilient, biodiversity rich,

environmentally sustainable and climate neutral County. Aligned to the Government's National Climate Objective (as set out in the national Climate Action Plan 2024), the new Plan outlines mitigation and adaptation climate action measures across the following five thematic areas:

- Governance and Leadership
- Built Environment and Transport
- Natural Environment & Green Infrastructure
- Communities: Resilience and Transition
- Sustainability & Resource Management

The actions in these themes collectively address the main goals and targets of this plan:

1. 50% improvement in Kildare CC's energy efficiency by 2030
2. 51% reduction in Kildare CC's greenhouse gas emissions by 2030
3. To make Kildare a climate resilient region for all, by reducing the impacts of future climate change-related events;
4. Empower the local community to engage with climate action through education, support, and ongoing collaboration and;
5. Enable socio-economic growth, placemaking and community development aligned to decarbonisation and a just transition.

The Plan sets out how Kildare CC will be responsible for enhancing climate resilience, increasing energy efficiency and reducing greenhouse gas emissions across its own assets, services and infrastructure to which it is fully accountable for.

In the development of the CAP, Kildare CC has reviewed the risks posed by climate change for the County and the implications of these risks for the delivery of services by Kildare CC. This has been achieved through a Climate Change Risk Assessment (CCRA) which identifies the likelihood of future climate hazards and their potential impacts. The CCRA has been undertaken, in accordance with 'Technical Annex B: Climate Change Risk Assessment' of the 'Local Authorities Climate Action Planning Guidelines'.

A qualitative CCRA supports the identification and prioritisation of potential future climate risks for more detailed analysis and provides a broad understanding of where adaptation actions could be required. The approach comprises of two phases, where both current and future risks and impacts are assessed.

11.1.3.6 Kildare County Development Plan (CDP) 2023-2029

The new Kildare CDP sets out the policy objectives and the overall strategy for the proper planning and sustainable development of the County over the plan period from 2023 to 2029.

The Energy & Communications chapter of the plan (Chapter 7) sets out detailed policy objectives in relation to climate action and the role of planning in climate change mitigation, climate change adaptation, and the transition towards a more climate resilient County. The Chapter addresses four key issues, namely:

- Energy Efficiency;
- Renewable Energy;
- Energy Supply & Infrastructure;

- Climate Adaptation & Mitigation

These issues have been identified as being of particular significance in helping to achieve sustainable planning outcomes which will ultimately help to deliver a low carbon and a climate resilient County. Planning already plays a role in each of the key areas identified in the Kildare CAP. Having regard to the headings set out in the Kildare CAP, the Development Plan contains a range of policy objectives which aim to mitigate and adapt to climate change.

The creation of a climate resilient County is an overarching strategic outcome of the Kildare CDP, and as such, the theme permeates the entire plan with a selection of policy objectives in multiple Chapters all contributing to aid in the transition of the County to a climate resilient low carbon society[5]. Relevant policy objectives and their incorporation into the Proposed Development design have been considered in the preparation of this Chapter.

The Kildare Climate Change Action Plan' (2024-2029) outlines a number of goals and plans to prepare for and adapt to climate change. There are five key action areas within the plan: energy and buildings, transport, flood resilience, nature-based solutions and resource management.

The Kildare CC Climate Change Action Plan noted that residential sector accounted for 391,323 tCO2e or 23.3% in 2018. The Kildare CC Climate Action Plan (2024-2029) aims to create a cleaner, greener, and more resilient county. The Climate Action Plan has specific actions that have either been delivered, are in development stage or drafted for the future implementation. For instance, Kildare CC are also assisted by the Office of Public Works on flood alleviation schemes.

The Kildare CC Climate Adaptation Strategy (Kildare County Council 2019) includes 121 adaptation measures to deliver across six significant goals to mitigate climate change. The delivery of these goals varies between 1-5 years contingent on the aim. The strategy, spanning from 2019 to 2024, focuses on ensuring a proper comprehension of the key risks and vulnerabilities of climate change, implementing climate-resilient actions in a planned and proactive manner, and mainstreaming climate adaptation considerations into all plans and policies.

The Applicant also aims to support national, regional, and local climate policy. All of the Applicants new homes are in accordance with the RIAI climate change targets, and they ensure reduced levels of embodied carbon in each of the houses built. The Applicant are on a mission to create net zero carbon homes in the future, to ensure they are playing their part to reduce carbon emissions, but to also disrupt and challenge the industry to be more sustainable. They are the first and only Irish housebuilder to be Global Real Estate Sustainability Benchmark (GRESB) accredited, demonstrating their commitment to create sustainable homes for their customers.

The key components of the Applicants ESG Policy on Environmental Sustainability are as follows:

- Build very energy efficient houses
- Built the largest award winning certified Passive House development in Ireland
- R&D programme to achieve continuous improvement in our designs and building methods to reduce CO2 emissions
- All housing is wired ready for EV chargers, solar PV
- Transitioned electricity supply to 100% renewable electricity for head office and all construction sites

- Replaced 750 000km of diesel car use with full EV Vehicles. The target for full fleet transition by 2025
- Design low carbon developments in all aspects of design, construction and waste management
- Water conserving low flow plumbing fittings are installed as standard
- Waste segregation on site
- Waste reduction management plan
- Developments use excavated soil on site in recreational areas

11.1.3.7 Maynooth Local Area Plan 2025–2031

Objective DO1.4 of the Maynooth and Environs Joint Local Area Plan 2025–2031 requires that new developments:

- Demonstrate support for climate neutrality, including mitigation of greenhouse gas (GHG) emissions and adaptation to climate change.
- Protect and enhance local biodiversity, integrating nature-based solutions and supporting ecological networks.

Climate Neutrality: Mitigation and Adaptation Measures

A. Greenhouse Gas Emissions Assessment and Reduction

- The Railpark Maynooth development undertook a comprehensive Greenhouse Gas Emissions Assessment (GHGA) using the Transport Infrastructure Ireland (TII) Carbon Assessment Tool and the Irish Green Building Council's Lifecycle Assessment Tool. These tools quantified emissions across all project phases (construction, operation, maintenance).
- The total construction phase GHG emissions are estimated at 36,860.56 tonnes CO_2e, which, when annualised over the project's 50-year lifespan, represents less than 0.0022% of Ireland's non-ETS 2030 emissions target and less than 0.0184% of the 2030 industry sectoral budget. Operational phase emissions are similarly minor, at 0.01323% of the 2030 residential sector budget.
- The project design incorporates best practice mitigation measures, including:
    - Use of low-carbon construction materials and circularity in design.
    - Energy-efficient building standards (NZEB compliance, BER A2/A3 targets).
    - Integration of renewable energy systems (PV panels, heat pumps).
    - Provision for electric vehicle charging and extensive cycle parking to promote sustainable transport.
    - Water-conserving plumbing and robust waste management plans.
    - Local sourcing of materials to minimize transport emissions.

B. Climate Change Risk Assessment and Adaptation

- A detailed Climate Change Risk Assessment (CCRA) was performed, evaluating the development's vulnerability to climate hazards (flooding, heat, drought, wind, wildfire, etc.). All identified vulnerabilities were classified as low, with no residual medium or high risks, indicating robust resilience to future climate impacts.
- The site is located in Flood Zone C, with low risk of fluvial, coastal, or groundwater flooding. The design incorporates Sustainable Urban Drainage Systems (SuDS) and climate-adaptive drainage infrastructure, with allowances for increased rainfall and extreme weather events.
- Ongoing monitoring and adaptive management are embedded in the Environmental Management Plan, ensuring continued compliance and resilience.

C. Policy and Regulatory Compliance

- The development is explicitly aligned with national and EU climate objectives, including the Climate Action and Low Carbon Development Act 2021, the Climate Action Plan 2025, and the European Climate Law (Regulation EU 2021/1119).
- The project supports Kildare County Council's Climate Action Plan 2024–2029, targeting a 51% reduction in GHG emissions by 2030 and a transition to climate neutrality by 2050.

Biodiversity Protection and Enhancement

A. Integration with LAP Biodiversity Objectives

- The development supports the LAP's biodiversity objectives (GBIO1.1–GBIO1.5), including protection of the Rye Water Valley/Carton SAC, minimization of impacts on the Royal Canal pNHA, and implementation of the Maynooth Biodiversity Action Plan 2023–2028.
- Expert ecological input was sought for lighting proposals to mitigate impacts on bats and other species, with artificial lighting restricted in sensitive zones.

B. Nature-Based Solutions and Green Infrastructure

- The scheme provides 2.67 hectares of public open space, including a local park, pocket parks, and children's play areas, supporting habitat connectivity and ecological networks.
- Landscaping incorporates native hedgerows, tree planting, and grassland restoration, enhancing local biodiversity and ecosystem services.
- Sustainable Urban Drainage Systems (SuDS) are designed to protect water quality and aquatic habitats, with surface water management aligned to LAP objectives for the Rye Water River.

C. Monitoring and Adaptive Management

- The Environmental Impact Assessment Report (EIAR) and associated Biodiversity Chapter commit to ongoing monitoring of biodiversity outcomes, adaptive management of habitats, and compliance with EU and national biodiversity regulations.

Cumulative and Residual Impacts

- The EIAR addresses cumulative impacts, demonstrating that the Railpark Maynooth development, in conjunction with other planned developments, will not result in significant adverse effects on climate or biodiversity, provided mitigation and monitoring measures are implemented.
- Residual impacts are assessed as long-term, minor adverse, and not significant, with the development contributing positively to the LAP's climate neutrality and biodiversity goals.

In summary the Railpark Maynooth development demonstrably supports climate neutrality and biodiversity goals under Objective DO1.4 of the Maynooth LAP by:

- Minimizing and mitigating GHG emissions through best practice design, construction, and operational measures.
- Ensuring resilience and adaptation to climate change via robust risk assessment and infrastructure.
- Protecting and enhancing local biodiversity through nature-based solutions, habitat connectivity, and compliance with statutory conservation objectives.
- Aligning with national, regional, and local climate and biodiversity policies, and embedding ongoing monitoring and adaptive management.

This integrated approach ensures the development is consistent with the LAP's vision for a climate-neutral, biodiversity-rich, and sustainable future for Maynooth.

11.1.3.8 Guidance

The assessment has referred to national guidelines, where available, in addition to international standards and guidelines relating to the assessment of GHG emissions and associated climatic impact. These are summarised below:

- 2030 Climate and Energy Policy Framework (European Commission, 2014)
- 2030 EU Climate Target Plan (European Commission, 2021b)
- Assessing GHG Emissions and Evaluating their Significance the Institute of Sustainability & Environmental Professionals (ISEP formerly known as IEMA), 2022)
- Carbon Management in Infrastructure (European Commission, 2013)
- Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) (Government of Ireland, 2021)
- Climate Action Plan 2025 (Government of Ireland, 2025)
- Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate (UK Highways Agency, 2019)
- Department of Housing, Planning, and Local Government. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2018)
- European Commission. Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (2013)

- European Commission. Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027 (2021a)
- ISEP. EIA Guide to: Climate Change Resilience and Adaptation (2020a)
- ISEP. GHG Management Hierarchy (2020b)
- ISEP. Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance (2022)
- Irish Green Building Council, Land Development Agency (LDA), and Environmental Protection Agency (EPA). The Carbon Designer for Ireland Tool
- Publicly Available Specification (PAS) 2080: 2016
- Transport Infrastructure Ireland (TII). GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (2022c)
- Transport Infrastructure Ireland (TII). GE-GEN-01101: Guide to the Implementation of Sustainability for TII Projects (2023)
- Transport Infrastructure Ireland (TII). PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (2022a)
- Transport Infrastructure Ireland (TII). PE-ENV-01105: Climate Assessment Standard for Proposed National Roads (2022b)
- Integrating Climate Change into Strategic Environmental Assessment in Ireland – A Guidance Note (EPA, 2015)

11.2 STUDY METHODOLOGY

Climate change is recognised as one of the most serious global environmental problems and arguably the greatest challenge facing humanity today. While natural variations in climate over time are normal, anthropogenic activities have interfered greatly with the global atmospheric system by emitting substantial amounts of greenhouse gases (GHGs). This has caused a discernible effect on our global climate system, with continued change expected due to current and predicted trends of GHG emissions. In Ireland this is demonstrated by rising sea levels, changes in the ecosystem, and extreme weather events.

Carbon dioxide (CO2) emissions have a global climate warming effect. This is regardless of rate of release, location or the weather when released into the atmosphere. This is unlike pollutants that affect local air quality where the rate of release, location and prevailing weather, as well as the amount of pollutant, determines the local concentrations and the impact. Local ambient concentrations of CO2 are not relevant for climate change and there are no limits or thresholds that can be applied to particular sources of carbon emissions. Any amount of CO2 released into the atmosphere will contribute to climate warming, the extent of which is determined by the magnitude of the release. Although CO2 emissions are typically expressed as kilogrammes or tonnes per year, there is a cumulative effect of these emissions because CO2 emissions have a warming effect which lasts for 100 years or more.

In this regard, the methodology adopted in this chapter covers two separate assessments – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) – This evaluation estimates the greenhouse gas emissions generated by a project throughout its entire lifespan. It then compares these emissions against pertinent Irish carbon budgets, targets, and policies to help gauge their

significance.; The Transport Infrastructure Ireland (TII) Carbon assessment tool and the Irish Green Building Councils (IGBC) Lifecycle Assessment Tool have been used for this assessment and

- Climate Change Risk Assessment (CCRA) – This analysis examines how a changing climate could affect a project and its surrounding environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

Further details on the methodologies undertaken are presented in the following sections.

11.2.1 Desk Surveys

A desktop study involving various national and international documents on climate change and analysis of synoptic meteorological data from the nearest Met Eireann station (Casement Aerodrome) was also carried out in order to compile this report. Attention has been focused on Ireland's obligations under the Paris Agreement in the context of the overall climatic impact of the presence and absence of the Proposed Development.

This analysis was undertaken by means of a desktop assessment based on available relevant guidance and information sources, and with reference to other chapters of this EIAR.

The following information sources have been consulted in relation to the assessment of climate aspects for the proposed Project:

- Key material, resource and cut/fill balance inputs from the description of the proposed Project presented in Project Description and Construction Strategy of this EIAR;
- Traffic figures from Traffic and Transportation;
- Building Lifecycle and Energy Report findings;
- Site Specific Flood Risk Assessment
- Estimates of likely waste volumes from the description of the proposed Project presented in Project Description, Construction Strategy, Land and Soils and Resource and Waste Management of this EIAR; and
- Environmental Protection Agency (EPA) Greenhouse Gas Emissions Inventories and Projections.

11.2.2 Climatics

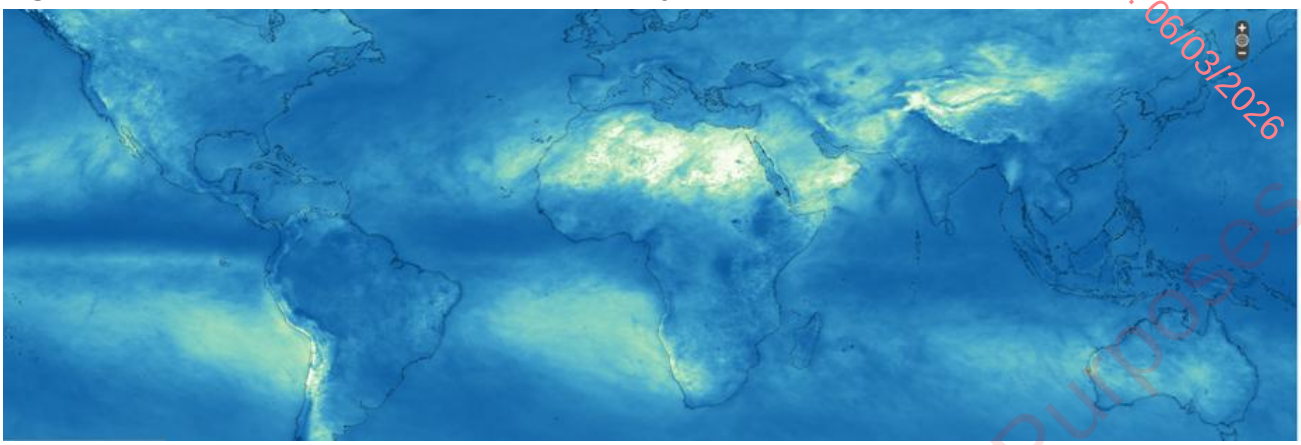
Summary of the Approach

This DNV assessment was primarily based on the on-site climate risk projections generated CMIP5/CMIP6 climate model. The tool is typically used in combination with multiple Shared Socio-economic pathways/ Representative Concentration Pathways (SSPs/RCPs), which represent different future greenhouse gas concentration trajectories developed by the International Panel on Climate Change. The assessment was undertaken for two representative scenarios SSP1-2.6/RCP 4.5 and SSP5-8.5/RCP 8.5:

- SSP1-2.6/RCP 4.5 (transition from 2030) – this scenario leads to global warming exceeding 2 °C by 2100 but remaining below 3 °C. It is described as an intermediate scenario; and

- SSP5-8.5/RCP 8.5 (business as usual) – this scenario leads to global warming significantly exceeding 3 °C by 2100 and is generally taken as the basis for the worst-case climate change scenarios.

Figure 11.3: multi-model ensembled rainfall projection for 2050 (SSP5-8.5)



We combine the global data from multiple IPCC models (ACCESS, GFDL-ESM4, HadGEM) to address the model uncertainty. Figure 11.3 showcases the multi-model ensembled of rainfall projection for 2050 under SSP5-8.5 scenario. Through DNV's proprietary method, we downscale and refine the global data to a 5km grid resolution for various regions like Australia, Contiguous United States (CONUS), Europe, and the United Kingdom. Leveraging these refined datasets, we can assess multi-hazard risk exposure for assets and portfolios across different geographical areas.

Table 11.1: Assessment of Climate Risk Indices

Category	Hazard
Temperature related indices	Surface temperature
	Warm Days
	Fire Weather Days
	Heat Stress Index
Rainfall related extremes	Precipitation
	Heavy Precipitation Days
	Extreme Precipitation Days
	Flood Events
Aridity/Drought conditions	Water stress
Irradiance at surface	Surface reading solar radiation
Cloud related	Cloud cover
Wind extremes	Wind speed
	Storm wind speed
Subsidence and landslide	Subsidence susceptibility index
	Landslide
Hailstorm	Hailstorm frequency
Lightning	Lightning density

11.2.3 Field Surveys

No site-specific baseline surveys were undertaken as part of the assessment for climate. The baseline data presented in this section is derived from the EPA Projections and Met Éireann monitoring network and may be taken as representative of the background climate within the Study Area.

11.2.4 Assessment Methodology

11.2.4.1 Key Parameters for Assessment

This assessment has been undertaken in line with the Institute of Environmental Management and Assessment (ISEP) guide 'Assessing Greenhouse Gas Emissions and Evaluating their Significance', 2nd Edition, 2022. The following aspects of the proposed Project are assessed in this chapter:

- Potential direct greenhouse gas (GHG) emissions associated with the construction of the proposed Project – this includes site clearance, embodied carbon, material transport, construction activities and waste management.
- Potential changes in GHG emissions associated with emissions during the operational phase of the proposed Project; and
- Vulnerability of both the construction and operational phases of the proposed Project to climate change.

11.2.4.2 GHG Appraisal Method - Construction Phase (Including Material Delivery and Spoil Removal)

The GHG assessment accounts for various components relating to the project during different life stages to determine the total impact of the development on climate. The building life expectancy for the purposes of the assessment is 50 years, typical for this type of development. GHG emissions are attributed to four main categories, taken from BS EN 15978. These categories are:

- Production Stage (Embodied carbon); The carbon emissions at this stage originate from the extraction of raw materials, their transportation to manufacturing sites, and the primary energy consumed (along with the associated carbon impacts) during the conversion of these raw materials into construction products. These phases have been included in the scope of this assessment, and relevant information has been integrated into the TII tool (TII, 2022).
- Pre-construction/Construction Stage; These carbon impacts stem from the delivery of construction products to the site and their subsequent processing and assembly into the building. This aspect has been incorporated into the assessment's scope.
- Operational Stage: This encompasses a broad range of sources, including greenhouse gas emissions from building operations (energy), maintenance, and replacement which have been included in this assessment.
- End of Life Stage: The sustainable deconstruction and disposal of the existing building at the end of its life (Approx 50 years) consider the activities carried out by demolition contractors on-site. However, no credit is given for potential future carbon benefits from reusing or recycling materials into new products. This stage is not included in the scope of this study due to the variability and uncertainty surrounding deconstruction methods that may be employed at the end of the development's lifespan.

Information and data from the building lifecycle report, building energy ratings and energy statement have been utilised for this chapter.

Nearly Zero Energy Buildings' (NZEB) means a building that has a very high energy performance. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby. Non-residential building information.

The Non-Domestic Energy Assessment Procedure (NEAP) is Ireland's official methodology for calculating a Building Energy Rating (BER) for non-domestic buildings. BER assessors use the NEAP software tool and guidance manuals to publish non-domestic Building Energy Rating (BER) certificates and advisory reports and to demonstrate compliance with Part L of the building regulations. The NEAP software calculates the energy consumption and carbon dioxide emissions of a building. It considers space heating and cooling, water heating, ventilation and lighting information.

Simplified Building Energy Model (SBEMie) or other approved software can be utilised to publish non-domestic BERs and demonstrate compliance with Part L.

Primary energy use and the associated carbon dioxide emissions are calculated using the Non-Domestic Energy Assessment Procedure (NEAP) and these parameters must not exceed specified target values.

To achieve NZEB compliance for primary energy use, the energy performance coefficient (EPC) of a building must be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC), which is 1.0.

An acceptable carbon dioxide emissions rate for NZEB compliance is achieved if the calculated carbon performance coefficient (CPC) is no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC), which is 1.15.

In terms of reporting units, all units are in equivalent kilogrammes of carbon dioxide – hereafter kg CO2eq. Equivalent kilograms of carbon dioxide (kg CO2eq) are used as a standardised unit for numerous greenhouse gases such as methane and nitrous oxide. Summary data is presented as tonnes of CO2eq for ease of reference of this data.

Residential building information

The Dwelling Energy Assessment Procedure (DEAP) is used by BER assessors to calculate the energy performance and carbon dioxide emissions of a home's space heating, water heating, ventilation, and lighting. DEAP consists of a software tool and guidance manuals. BER Assessors use DEAP to publish Building Energy Rating (BER) certificates and advisory reports for homes. DEAP is also the compliance tool specified in Part L of the Irish Building Regulations.

The DEAP software is web-based and used to calculate the annual delivered energy consumption, primary energy consumption (kWh/m2/year) and carbon dioxide emissions (kgCO2/m2/y) for standardised occupancy. For all new builds, NZEB is equivalent to a 25% improvement in energy performance on the 2011 Building Regulations. Key changes to Part L for NZEB compliance include a Maximum Energy Performance Coefficient of 0.3, a Maximum Carbon Performance of 0.35 and a renewable Energy Ratio of 20%.

The project design team have also utilised the Irish Green Building Councils (IGBC) Carbon Designer tool for Ireland. The Irish Green Building Council, in collaboration with One Click LCA Ltd., have

developed the Carbon Designer for Ireland tool specifically for Irish building projects. Endorsed by the EPA and the Land Development Agency, this tool is compliant with standards such as EN 15978, ISO 21931–1, ISO 21929, and the data requirements of ISO 14040 & EN 15804. It is also aligned with LEED, BREEAM, and PAS 2080. The tool enables users to evaluate the carbon footprint of buildings in the early stages by using typical default materials and values. Users input details such as gross floor area, number of stories, and building frame type.

After establishing a baseline with generic data, the tool facilitates the exploration of various options and the optimisation of carbon impacts. It identifies the most carbon-intensive elements within the building and suggests alternatives with lower carbon footprints. This provides a high-level initial assessment of the lifecycle carbon for the development based on basic information and default values with the option to edit these defaults as required to reduce impacts.

The primary factor in reducing climate impact is the extent of proposed mitigation. Thus, using construction materials with lower carbon intensity can help reduce climate effects. This assessment aims not for perfection but to identify areas with significant carbon impact. We can then explore potential mitigation measures to reduce this impact. Outputs from the IGCB tool have been reviewed and implemented where relevant to reduce the climate impact of the Proposed Development.

Transport Infrastructure Ireland's (TII) proprietary carbon tool has been used to quantify carbon emissions from non-building elements such as material delivery, spoil removal, roads, and infrastructure. The carbon tool is a spreadsheet-based product, developed by TII, with the goal of identifying, estimating and mitigating greenhouse gas emissions that accrue on large road and rail infrastructure projects. The carbon tool is closely aligned with guidance set out in PAS 20803 which suggests a modular structure for capturing and reporting carbon emissions according to lifecycle phase. Where the exact material needed isn't listed an estimate to a similar material type has been used. The construction waste and construction traffic information were reviewed from the traffic and waste chapters.

Design data for materials, earthworks and transport distances are based on input data from the design team. Where detailed designs are not available for various parts of the project, assumptions are made based on industry best practice and default values in the carbon tool. In particular, transport distances for materials have been estimated, as no specific suppliers have been selected at this early stage of the proposed Project. This allows for an estimate of transport emissions, using an emissions factor for kg CO2eq/km in the carbon tool.

The use of the TII Carbon Tool was not considered suitable for the building elements of the Proposed Development. As the TII Carbon Tool was developed for road and infrastructure projects, the material types within the tool are specific to these types of developments. These material types are not fully appropriate for assessing the embodied carbon associated with the construction of buildings. Therefore, the carbon impact of the buildings was carried out using an alternative tool; the Carbon Designer for Ireland tool. The IGBC tool in combination with BER/NEAP assessments have been used for the building and operational carbon assessment.

11.2.4.3 GHG Appraisal Method - Operational Phase

Traffic Emissions

As per the EU guidance document Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013) the climate baseline is first established by reference to EPA data on annual GHG emissions (see Section 11.3 below). Thereafter the impact of the Proposed Development on climate is determined. Emissions from road traffic associated with the Proposed Development have the potential to emit carbon dioxide (CO2) which will impact climate.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments LA 114 Climate (UK Highways Agency, 2019). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the operational stage. During the operational phase, if any of the road links impacted by the Proposed Development meet the below criteria then further assessment is required.

- A change of more than 10% in AADT;
- A change of more than 10% to the number of heavy duty vehicles; and
- A change in daily average speed of more than 20 km/hr.

The Proposed Development will result in the operational phase traffic increasing by more than 1,000 AADT on two road links.

As a result, a detailed assessment of traffic related CO2 emissions was conducted. PE-ENV-01104 (TII, 2022a) advises that road traffic related emissions information should be obtained from an Air Quality Practitioner to show future user emissions during operation without the development in place. The DNV Air Quality Practitioner calculated the traffic related emissions through the use of the TII REM tool (TII, 2022b) which includes detailed fleet predictions for age, fuel technology, engine size and weight based on available national forecasts. The output is provided in terms of CO2eq for the Opening Year 2028 and Design Year 2043. Both the Do Nothing and Do Something scenarios are quantified in order to determine the degree of change in emissions as a result of the Proposed Development. Traffic data was obtained from Traffic Consultants for the purpose of this assessment. Inputs include light duty vehicle (LDV) annual average daily traffic movements (AADT), annual average daily heavy-duty vehicles (HDV AADT), annual average traffic speeds, road link lengths, road type and project county location. Further details are provided in Chapter 10 ‘Air Quality’.

Operational GHG Emissions

The EU guidance (2013) also states indirect GHG emissions as a result of a development must be considered, this includes emissions associated with energy usage. In addition to the EU guidance, the Institute of Environmental Management and Assessment (ISEP) guidance note on ‘Assessing Greenhouse Gas Emissions and Evaluating their Significance’ (ISEP, 2022) states that “the crux of significance regarding impact on climate is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050”. Mitigation has taken a leading role within the guidance compared to the previous edition published in 2017. Early stakeholder engagement is key and therefore mitigation should be considered from the outset of the project and continue throughout the project’s lifetime in order to maximise GHG emissions savings.

The Energy Statement prepared by Fallon Design (2025), building lifecycle report and IGBC outputs in relation to this assessment has been reviewed and used to inform the operational phase climate assessment. This report outlines several measures in relation to energy usage from the Proposed

Development primarily in relation to heat and electricity. Several measures have been incorporated into the overall design of the development to reduce the impact to climate where possible, in line with the objectives of the ISEP guidance (2022).

11.2.4.4 Assessment Criteria for GHG Emissions

After the publication of the 2021 Climate Amendment Act in July 2021 and the 2021 CAP, the carbon budgets were approved and a series of sectoral emissions ceiling were published, including sectoral emissions ceilings for the residential sector (DECC, 2021). These ceilings will allow a comparison with the net CO2 projected GHG emissions from the Project.

The ISEP Climate Change principles (ISEP, 2020) document provides a section on how to assess GHG emissions in EIA and states:

- "When evaluating significance, all new GHG emissions contribute to a significant negative environmental effect; however, some projects will replace existing development that have higher GHG profiles. The significance of a project's emissions should therefore be based on its net impact, which may be positive or negative.
- "Where GHG emissions cannot be avoided, the EIA should aim to reduce the residual significance of a project's emissions at all stages."
- "Where GHG emissions remain significant but cannot be farther reduced… approaches to compensate the project's remaining emissions should be considered."

The process for determining the significance of effects involves two key steps: first, defining the magnitude of the impacts, and second, evaluating the sensitivity of the receptors (e.g., Ireland's National GHG targets). Although there are no specific project criteria for climate assessment, the project will be evaluated using the recommended ISEP significance determination approach. This evaluation will account for any embedded or planned mitigation measures included in the project design (ISEP, 2020).

According to LA 114, professional judgment is essential when contextualizing and assessing the significance of a project's GHG impact. In alignment with ISEP Guidance, LA 114 emphasises that the core of assessing significance is not just whether a project emits GHGs or the magnitude of these emissions alone, but rather whether the project helps reduce GHG emissions compared to a baseline that aligns with a net zero trajectory by 2050 (UK Highways Agency, 2019).

Significance determination for emissions generated by the project in this assessment is based on the criteria presented in Table 11.2 as guided by ISEP in addition to the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

Table 11.2: Definition of Climate Significance

Magnitude of Impact	Description
Major or Moderate Adverse (i.e. significant)	A project that follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the net zero trajectory by 2050 or sectoral based transition to next zero targets, results in a significant adverse

	effect. It is down to the consultant completing the assessment to differentiate between the 'level' of significant adverse effects, e.g. 'moderate' or 'major' adverse effects. A project's impact can shift from significant adverse to non-significant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science-based emissions trajectory of ongoing but declining emissions towards net zero. Meeting the minimum standards set through existing policy or regulation cannot necessarily be taken as evidence of avoiding a significant adverse effect. This is particularly true where policy lags behind the necessary levels of GHG emission reductions for a science based 1.5°C compatible trajectory towards net zero.
Minor Adverse (i.e. not significant)	A project that is compatible with the budgeted, science based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve an impact that has a minor adverse effect but is not significant. The project may have residual impacts but is doing enough to align with, and contribute to, the relevant transition scenario. A 'minor adverse' or 'negligible' non-significant effect conclusion does not necessarily refer to the magnitude of GHG emissions being carbon neutral (i.e. zero on balance) but refers to the likelihood of avoiding severe climate change and achieving net zero by 2050. A 'minor adverse' effect or better is a high bar and indicates exemplary performance where a project meets or exceeds measures to achieve net zero earlier than 2050.
Negligible	A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory, and has minimal residual emissions, is assessed as having a negligible effect that is not significant.
Beneficial	A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory, and has minimal residual emissions, is assessed as having a negligible effect that is not significant.

Ireland's carbon budgets provide a framework for understanding the significance of GHG emissions from the Proposed Development. This involves comparing the anticipated net GHG emissions of the development with the established carbon budgets. With the introduction of the Climate Action Act in 2021 and the Climate Action Plan 2025, sector-specific carbon budgets have been outlined for comparison with the development's net GHG emissions over its lifecycle. For the Transport sector, which emitted approximately 12 MtCO2e in 2018, the budget has a 2030 cap of 6 MtCO2e, reflecting a 50% reduction. Similarly, the Industry sector, with 2018 emissions of about 7 MtCO2e, has a 2030 ceiling of 4 MtCO2e, indicating a 35% reduction (see Table 11.5).

11.2.4.5 Climate Change Risk Assessment-Criteria for Climate Vulnerability

Climate change risk assessment is a risk assessment-based methodology for identifying potential climate impacts and assessing their severity. Carrying out a climate change risk assessment, at the simplest level, can be summarised into the following steps:

- identifying potential climate change risks to a scheme or project.
- assessing these risks (potentially prioritising to identify the most severe); and
- formulating mitigation actions to reduce the impact of the identified risks.

Any assessment of risk includes assessing the likelihood (or probability) and magnitude (or severity) of the impacts identified. This method is widespread within the climate change resilience assessments carried out by projects and cities to date.

The risk assessment assesses the likelihood and consequence of the impact occurring to each receptor, leading to the evaluation of the significance of the impact and the vulnerability of the Proposed Development to various climate hazards. The vulnerability is determined by combining the sensitivity and the exposure of the Proposed Development to various climate hazards.

To evaluate the likelihood of climate risk, we have utilised the baseline environmental information provided in Section 11.3, future climate change models, and insights from other experts involved in the Proposed Development (e.g., hydrologists and traffic consultants).

Initially, a preliminary Climate Change Risk Assessment (CCRA) focusing on the operational phase is performed, following the TII guidance PE-ENV-01104 (2022). This involves assessing the sensitivity of the development assets (i.e., receptors) and their exposure to climate change hazards. Each asset category within the Proposed Development must be assigned a level of sensitivity to climate hazards. PE-ENV-01104 outlines the asset categories and climate hazards that should be considered.

The specific asset categories will differ depending on the type of development and need to be determined on a case-by-case basis.

- **Asset Categories** Pavements; drainage; structures; utilities; landscaping; signs, light posts, buildings, and fences.
- **Climate Hazards** Flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning and hail; landslides; fog.

The sensitivity is based on a High, Medium or Low rating with a score of 1 to 3 assigned as per the criteria below.

- **High Sensitivity** The climate hazard will or is likely to have a major impact on the asset category. This is a sensitivity score of 3.
- **Medium Sensitivity** It is possible or likely the climate hazard will have a moderate impact on the asset category. This is a sensitivity score of 2**.**
- **Low Sensitivity** It is possible the climate hazard will have a low or negligible impact on the asset category. This is a sensitivity score of 1.

Once the sensitivities have been identified the exposure analysis can be completed. The exposure analysis involves determining the level of exposure of each climate hazard at the project location

irrespective of the project type for example: flooding could be a risk if the project location is next to a river in a floodplain. Exposure is assigned a level of High, Medium or Low as per the below criteria.

- **High Exposure** It is almost certain or likely this climate hazard will occur at the project location i.e. might arise once to several times per year. This is an exposure score of 3.
- **Medium Exposure** It is possible this climate hazard will occur at the project location i.e. might arise a number of times in a decade. This is an exposure score of 2.
- **Low Exposure** It is unlikely or rare this climate hazard will occur at the project location i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

Once the sensitivity and exposure are categorised, a vulnerability analysis is conducted by multiplying the sensitivity and exposure to calculate the vulnerability.

Vulnerability = Sensitivity x Exposure

The vulnerability assessment takes any proposed mitigation into account. Table 11.4 details the vulnerability matrix; vulnerabilities are scored on a high, medium and low scale. Where residual medium or high vulnerabilities exist, the assessment may need to be progressed to a detailed climate change risk assessment and further mitigation implemented to reduce risks.

According to TII guidance and EU technical guidance, if all identified vulnerabilities are reasonably ranked as low, a detailed climate risk assessment may not be necessary. In such cases, the impact of climate change on the development would be deemed insignificant.

However, if there are residual medium or high vulnerabilities, a more detailed climate change risk assessment may be required, along with the implementation of additional mitigation measures to address the risks. The TII guidance specifies that a construction phase Climate Change Risk Assessment (CCRA) is only required if a detailed CCRA is deemed necessary.

Table 11.4: Vulnerability Matrix

	Exposure			
Sensitivity		High (3)	Medium (2)	Low (1)
	High (3)	9- High	6- High	3- Medium
	Medium (2)	6- High	4- Medium	2- Low
	Low (1)	3- Medium	2- Low	1- Low

The vulnerability conclusions for each impact are based on, and incorporate, confirmed design and mitigation measures. Where the assessment concludes that the impact remains high, the project team may need to identify additional adaptation/EIA mitigation measures.

The screening CCRA, detailed in Section 11.3.3., did not identify any residual medium or high risks to the Proposed Development as a result of climate change. Therefore, a detailed CCRA for the construction and operational phase were scoped out.

While a CCRA for the construction phase was not required, best practice mitigation against climate hazards is still recommended in Section 11.8.

11.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SITUATION)

11.3.1 Existing GHG Emissions Baseline

In 2023, Ireland's GHG emissions are estimated to be 55.01 million tonnes carbon dioxide equivalent (Mt CO2eq), which is 6.8% lower (or 4.00 Mt CO2eq) than emissions in 2022 (59.00 Mt CO2 eq) and follows a 2.0% decrease in emissions reported for 2022. Emissions are 1.2% below the historical 1990 baseline for the first time in 33 years (EPA, 2024).

Climate impacts are evaluated at a national level, considering national targets and sectoral emission ceilings. The study area for climate assessments is the Republic of Ireland, with the baseline established in the context of this geographic focus.

In 2023 emissions in the stationary ETS1 emissions decreased (17%) and emissions under the ESR (Effort Sharing Regulation) decreased (3.4%). When LULUCF is included, total national emissions decreased by 3.8% (EPA, 2024).

Decreased emissions in 2023 compared to 2022 were observed in the largest sectors except for transport which showed an increase of 0.3% shown highlighted red in the "Emissions change 2022-2023" table 11.5 below (EPA, 2024). Climate impacts are evaluated at a national level, considering national targets and sectoral emission ceilings. The study area for climate assessments is the Republic of Ireland, with the baseline established in the context of this geographic focus.

The table shows that the residential sector accounted for 5.3 Mt CO2eq in 2023.

Table 11.5: Emissions change 2022-2023 Ireland.

Mt CO_2 eq	**2022**	**2023**	**% Change**
Agriculture	21.782	20.717	-4.9%
Transport	11.759	11.798	0.3%
Energy Industries	10.003	7.860	-21.4%
Residential	5.753	5.347	-7.1%
Manufacturing Combustion	4.356	4.152	-4.7%
Industrial Processes	2.294	2.155	-6.1%
F-Gases	0.719	0.675	-6.0%
Commercial Services	0.734	0.715	-2.6%
Public Services	0.690	0.671	-2.7%
Waste	0.870	0.844	-3.0%
LULUCF	3.655	3.895	6.5%
Total excluding LULUCF	**58.960**	**54.934**	-6.8%
Total including LULUCF	**62.616**	**58.829**	-6.0%

Emissions per capita decreased from 11.31 tonnes CO_2eq/person in 2022 to 10.34 tonnes CO_2eq/person in 2023. Ireland's average tonnes of GHG/capita over the last ten years were 12.08 tonnes. With CSO 2023 census data showing a population of 5.28 million people and with population projected to increase to 5.67 million in 2030, 6.05 million in 2040 and 6.33 million by 2050, per capita emissions need to reduce

significantly. At current per capita emission levels, each addition 500,000 people would contribute an additional 5 million tonnes of CO_2eq annually (EPA, 2025).

The EPA also publishes GHG emission projections to 2055. Table 11.6 shows that in the WAM scenario the percentage reduction is not achieved for electricity, transport, industry, agriculture and other (comprises of waste, fluorinated-gases and petroleum refining). Looking at the overall percentage emissions reduction target of -51% by 2030 compared to 2018, the projections are indicating a significant shortfall with only a -29% reduction achieved thus predicting that Ireland will not achieve its legally binding climate target (EPA, 2024).

Table 11.6: Assessment of Achievement of Sectoral Percentage Targets under the With Additional Measures scenario (EPA)

Sector	**Emissions 2018 (Mt CO_2eq)**	**Projected Emissions 2030 (Mt CO_2eq)**	**Percentage Change 2030 vs 2018**	**Target Reduction 2030 vs 2018**	**Percentage Change (Reported in 2024) 2030 v 2018**
Electricity	10.2	3.1	-0.7	-75%	-0.66
Transport	12.3	9.7	-0.21	-50%	-0.29
Buildings (Residential)	7	5.4	-0.22	-40%	-0.4
Buildings (Commercial & Public)	1.5	1	-0.36	-45%	-0.6
Industry	7	6.1	-0.12	-35%	-0.24
Agriculture	21.4	18	-0.16	-25%	-0.18
Other	2.1	1.6	-0.25	-50%	-0.25
LULUCF* *(no ceiling currently)*	4	5.5	0.39	N/A	0.17
Total with LULUCF	65.6	50.6	-0.23	-51%	-0.29

*A

direct comparison of emissions in the agriculture sector against its Sectoral Emission Ceilings is no longer viable.
*** Waste, F-gases and Petroleum Refining*
****National objective includes LULUCF*

11.3.2 Future GHG Baseline

In line with TII and ISEP Guidance the future baseline is a trajectory towards net zero by 2050, "whether it [the project] contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050" (ISEP, 2022). The future baseline for GHG emissions assessment will be considered in relation to the future Irish climate targets which the assessment results will be compared against.

The future baseline will be based on Ireland achieving the targets outlined in the Climate Action Plan 2025 (CAP25) and subsequent Climate Action Plans, as well as meeting binding EU targets for 2030. In order to meet the commitments under the Paris Agreement, the European Union (EU) enacted

'*Regulation (EU) 2018/842 on binding annual GHG emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013*' (hereafter referred to as the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. The Regulation was amended in April 2023 and Ireland must now limit its greenhouse gas emissions by at least 42% by 2030. The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters Including electricity generation, cement manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and thus includes GHG emissions from transport, residential and commercial buildings and agriculture.

11.3.3 Current CCRA Baseline

Impacts to the proposed Project as a result of climate change involve increases in temperatures and increases in the number of rainfall days per year. Ireland has observed increases in the annual rainfall in the north and west of the country, with small increases or decreases in the south and east including in the region where the proposed Project will be located. The EPA (2021) has compiled a list of potential adverse impacts as a result of climate change including the following which may be of relevance to the proposed Project:

- Increase of 1 to 4 degrees Celsius in average temperature;
- More intense storms and rainfall events;
- Increased likelihood and magnitude of river and coastal flooding;
- Water shortages in summer in the east;
- Adverse impacts on water quality; and
- Changes in distribution of plant and animal species

The proposed Project area experiences a temperate, maritime climate, resulting in mild winters and cool summers. The Met Éireann weather station at Casement Aerodrome, County Dublin, is the nearest weather and climate monitoring station to the proposed Project that has meteorological data recorded for the 30-year period from 1991 to 2020 (Met Eireann, 2023). The monitoring station is located approximately 12km south of the proposed Project at its nearest point (Railpark). Meteorological data recorded at Casement Aerodrome over the 30-year period from 1991 to 2020 indicates that the wettest months were October and November, and the driest month on average was March. July was the warmest month with a mean temperature of 19.8°C.

Met Éireann recent weather patterns were analysed, they highlight a marked rise in both the frequency and intensity of storms. Notable examples include Storm Darwin in February 2014, Storm Emma in March 2018, Storm Ophelia in October 2018, and Storm Éowyn in January 2025. During Storm Ophelia, Casement Aerodrome recorded its highest wind gust, reaching 117 km/h, with a sustained 10-minute wind speed of 85 km/h.

Annual rainfall from 1989 to 2018 was 6% higher compared to the 30-year period from 1961 to 1990. On 24 October 2011, Casement Aerodrome recorded 76.5 mm of rainfall over a 9-hour span, an event with an annual probability of once in 60 years. As rainfall has increased in Ireland, recent years have seen more intense historical precipitation events, such as the heavy rainfall and flooding in the summer of 2008, severe flooding in November 2009, and the heavy rainfall in the Greater Dublin Area on 24 October

2011. The latest data from Met Éireann's 'The Status of Irish Climate 2020 Report' highlights that the 10-year period from 2006-2015 was the wettest recorded decade (Met Eireann, 2021).

Met Éireann's 2024 Climate Statement states 2024's average shaded air temperature in Ireland is provisionally 10.72 °C, which is 1.17°C above the 1961-1990 long-term average. This makes 2024 the fourth warmest year on record, 0.49 °C cooler than 2023, the warmest year on record. The five warmest years on record are 2023, 2022, 2007, 2024 and 1945. Seven of the top ten warmest years have occurred since 2005. (Met Eireann, 2024).

In 2024, Ireland experienced below-average rainfall, including the warmest May on record. Since April 2023, record-high sea surface temperatures (SST) were observed, with a severe marine heatwave affecting the western coast of Ireland in June 2023. This marine heatwave contributed to the unprecedented rainfall in July 2023 (Met Eireann, 2024).

Recent weather patterns and extreme weather records from Met Éireann have been examined. Given the exceptional data from 2023, Met Éireann notes that current Irish climate projections predict continued warming, including milder winters. The record temperatures increase the likelihood of extreme weather events, leading to longer dry periods and heavier rainfall. Additionally, sea level rise is expected to cause more storm surges and coastal flooding, with an increase in compound events where coastal surges and extreme rainfall occur simultaneously. While Met Éireann is confident that maximum rainfall rates will rise, there is less certainty about how the frequency or intensity of storms will change with climate change.

Surface air temperature plays a crucial role in climate analysis, influencing ecosystems, livelihoods, and human activities. Changes in temperature affect various sectors, including health, agriculture, and energy demand. In Ireland, over a century of consistent temperature measurements is available. Globally, the average surface air temperature has increased by 0.85°C over the past 100 years, with the rate of warming nearly doubling since 1975, reaching an equivalent of a 1.65°C rise per century. The five warmest years on record globally were 2015–2019, which is notable since temperature records began in the mid to late 1800s. Hotter, drier summers and milder, wetter winters are now more common in many parts of the world (Met Éireann 2020).

11.3.4 Future CCRA Baseline

The EPA-funded research project 'Ensemble of Regional Climate Model Projections for Ireland Report No. 159' (EPA 2015) forecasts significant reductions in mean annual, spring, and summer precipitation, with longer dry spells expected. By 2050, the most pronounced decreases are projected for summer, with reductions ranging from 0% to 13% under medium-to-low emission scenarios and 3% to 20% under high emission scenarios. In contrast, heavy precipitation during winter and autumn is expected to increase by up to 20%. Additionally, the number of extended dry periods during autumn and summer is anticipated to rise considerably by mid-century.

The report suggests that the total number of North Atlantic cyclones is expected to decrease by 10%, along with a reduction in average mean sea-level pressure of 1.5 hectopascals (hPa) across all seasons by mid-century. Wind energy is anticipated to decline in spring, summer, and autumn, with an increase expected in winter. Additionally, the predicted rise in extreme storm activity could negatively impact future wind energy supply.

The EPA's State of the Irish Environment Report (Chapter 2: Climate Change) further highlights that projections indicate that the comprehensive implementation of additional policies and measures from the 2019 Climate Action Plan could reduce Ireland's total GHG emissions by up to 25 percent by 2030 compared to 2020 levels. Climate change is already a current issue in Ireland, with a temperature increase of approximately 0.8°C since 1900. The report further highlights the importance of strong public sector climate leadership and the rapid acceleration of decarbonisation efforts if we are to halt the climate crisis (EPA, 2020).

Accurate climate projections are a key scientific input for national policymakers when planning for, and adapting to, the challenges posed by climate change. Climate projections are produced using climate models, which have been developed by scientists over recent decades and are capable of simulating Earth's past, present, and future climate. Global Climate Models (GCMs) are used to model the global impacts on Earth's climate of increasing greenhouse gas concentrations in the atmosphere at a resolution of ~50km or coarser. Regional Climate Models (RCMs) are used to capture key small-scale atmospheric features on the scale of 1-10km, such as local convection and wind gusts. Multi-model ensembles are often used in climate prediction studies to quantify associated model uncertainty.

RCMs utilise the output of GCMs and model regional climates at higher spatial resolutions; this process is known as dynamic downscaling. This approach allows key climate variables to be modelled more precisely, including precipitation; near-surface temperature; and the number and intensity of low-pressure systems. Low pressure systems are the primary driver of precipitation and wind affecting the country; therefore, the added value of RCMs in the modelling of low-pressure systems is of particular importance for Ireland.

Concentration trajectories known as Representative Concentration Pathways (RCPs) were utilised in EPA Research Report No.339 High resolution Climate Projections for Ireland – A Multi-model Ensemble Approach (EPA 2020). For the EPA study, two RCPs were chosen, RCP4.5 and RCP8.5. RCP4.5 is considered an intermediate scenario, while RCP8.5 is considered to be representative of a potential worst-case scenario.
The future climate was modelled using both the Representative Concentration Pathway 4.5 (RCP4.5) (medium-low) and RCP8.5 (high) scenarios. The study suggests that by mid-century (2041–2060), average annual temperatures are projected to rise by 1–1.2°C under RCP4.5 and 1.3–1.6°C under RCP8.5, with the most significant increases in the east. Temperature extremes are expected to become more pronounced, with summer daytime and winter night-time temperatures increasing by 1–2.4°C. The number of frost and ice days is projected to decrease by approximately 50%. Summer heatwaves are likely to become more frequent, especially in the south. Additionally, precipitation is expected to become more variable, with a significant increase in both dry periods and heavy rainfall events.

Established in June 2022, the National Framework for Climate Services (NFCS) aims to streamline the provision of climate services in Ireland and will be led by Met Éireann. The NFCS is designed to facilitate the co-production, delivery, and utilization of precise, actionable, and accessible climate information and tools to enhance climate resilience planning and decision-making. In parallel with the NFCS, ongoing research is being conducted through the TRANSLATE project. This initiative, led by climate researchers from the University of Galway's Irish Centre for High End Computing (ICHEC) and University College Cork's SFI Research Centre for Energy, Climate, and Marine (MaREI), with support from Met Éireann climatologists, is focused on advancing climate science. TRANSLATE generates outputs using internationally reviewed models from CORDEX and CMIP5, with Representative Concentration Pathways (RCPs) offering a range of possible futures based on different human activity scenarios.

TRANSLATE offers the first standardised and bias-corrected national climate projections for Ireland, designed to support climate risk decision-making across various sectors, such as transport, energy, and water. It provides insights into potential changes in Ireland's climate under global temperature increases of 1.5˚C, 2˚C, 2.5˚C, 3˚C, or 4˚Cs. These projections generally align with previous forecasts for Ireland. The country's climate is heavily influenced by the Atlantic Meridional Overturning Circulation (AMOC), a major system of ocean currents, including the Gulf Stream, which features a northward flow of warm water and a southward flow of cold water. This system prevents Ireland from experiencing the extreme temperatures seen in other countries at similar latitudes. Recent studies suggest that the AMOC may weaken by 30–40% by 2100, leading to cooler North Atlantic Sea Surface Temperatures (SSTs). Despite this, Ireland is expected to continue warming, though the cooling effect of the AMOC might moderate the warming relative to continental Europe. Additionally, a weakened AMOC is anticipated to contribute to further sea level rise around Ireland. Climate change will cause significant shifts in temperature and rainfall patterns: average summer temperatures could rise by more than 2°C, summer rainfall could decrease by 9%, and winter rainfall could increase by 24%. Future projections also include a tenfold rise in the frequency of summer nights with temperatures exceeding 15°C by the end of the century, a decrease in the frequency of cold winter nights, and an increase in heatwaves. In Ireland, a heatwave is defined as a period of five consecutive days with daily maximum temperatures above 25°C.

11.3.5 Evolution of the environment in the absence of the project

Annex IV of the EIA Directive sets out the information required to be included in an EIAR. This includes:

"a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the Proposed Project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge".

Under the Do-Nothing Scenario no construction works will take place and the previously identified impacts of carbon emissions from equipment, machinery and development operation will not occur. Therefore, this scenario can be considered neutral in terms of climate.

As the site is zoned for development, in the absence of the Proposed Development, it is likely that a development of a similar nature is likely to be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future, even in the absence of the Proposed Development.

11.3.6 Climatics Multi-Climate Hazard Analysis for (53.374932, -6.577307)

Under each scenario, nine categories of climate risk indices (20+ hazards) were assessed. The findings and recommendations are summarised in the following table. For the key indices, both the chronic risk (average trend) and acute risk (extremes) are provided. For example, the change in mean temperature and fire weather days are introduced in the temperature-related indices, as temperature is considered as the most relevant impact factor for climate change on asset resilience.

Table 11.7: Climatics Multi-Climate Hazard Analysis for (53.374932, -6.577307)

Category	Hazard	Summary	Exposure Level
Cloud Related	Cloud Cover	Historic average cloud cover in the area was 78.44%. This is projected to decrease to 77.89% (-0.56%) under SSP1-2.6 and 76.80% (-1.64%) under SSP5-8.5 for 2050.	4
Drought And Floods	Flood Events	The historic inundation of 100-yr flood event is 0.00 m. This is projected to 0.00 m (0%) under SSP1-2.6 and 0.00 m (0%) under SSP5-8.5 for 2050.	1
	Water Stress	The water stress index ranges from 1 to 5, with 1 indicating low stress and 5 indicating high stress. The historic water stress is rated as 2.00. And this is projected to increase to 5.00 under SSP1-2.6 and 5.00 under SSP5-8.5 for 2050.	5
Hailstorm	Hailstorm Frequency	Historical hailstorms in this location were 0.12 events/year.	n/a
Heat Stress	Heat Stress Index	The historic heat stress index in the area is 12.56. And this is projected to increase to 13.80 under SSP1-2.6 and 14.37 under SSP5-8.5 scenarios for 2050.	2
Irridiance At Surface	Surface Reaching Solar Radiation	The surface reaching solar radiation in the area was historically 119.88 W/m² and this is projected to increase to 125.94 W/m² under SSP1-2.6 and 124.52 W/m² under SSP5-8.5 for 2050.	2
Lightning	Lightning Density	The historic lightning density in the area was 0.00 event/1000km2/year.	n/a
Rainfall Related	Annual Max. 1-Day Precipitation	Historic annual maximum 1-day precipitation in the area was 34.24 mm. This is projected to increase to 36.72 mm under SSP1-2.6 and 37.32 mm under SSP5-8.5 for 2050.	4
	Annual Max. 5-Day Precipitation	Historic annual maximum 5-day precipitation in the area was 63.86 mm. This is projected to increase to 71.54 mm under SSP1-2.6 and 68.49 mm under SSP5-8.5 for 2050.	4
	Extreme Precipitation	Precipitation over 99% quantile is defined as extreme precipitation. The historic average extreme precipitation is 61.05 mm for a year and this is projected to increase to 75.28 mm (+23.31%) under SSP1-2.6 and 73.45 mm (+20.31%) under SSP5-8.5 for 2050.	4
	Heavy Precipitation Days	Precipitation over 10mm is defined as heavy precipitation. The historic average heavy precipitation days in the area was 25.10 days in a year. This is projected to increase to 26.32 days under SSP1-2.6 and 26.79 days under SSP5-8.5 for 2050.	5
	Average Annual Precipitation	Historic average precipitation in the area was 1015.68 mm/year. This is projected to increase to 1018.30 mm/year under SSP1-2.6 and 1010.87 mm/year under SSP5-8.5 for 2050.	5
Subsidence And Landslide	Landslides	The historic landslide in the area is 0.00.	n/a
	Subsidence Susceptibility Index	Subsidence susceptibility index ranges from 1-6, as very low, low, medium low, medium high, high, very high. The historic subsidence	n/a

		susceptibility index in the area is 3.00 and is projected to be 0.00 for 2040.	
Temperature Related	Cold Days	The historic cold days in the area were 7.83% per year. This is predicted to decrease to 3.11% under SSP1-2.6 and 1.61% under SSP5-8.5 for 2050.	2
	Days >35°C	The historic days above 35°C in the area were 0.00 days per year. This is predicted to decrease to 0.00 days under SSP1-2.6 and 0.00 days under SSP5-8.5 for 2050.	1
	Days >40°C	The historic days above 40°C in the area were 0.00 days per year. This is predicted to 0.00 days under SSP1-2.6 and 0.00 days under SSP5-8.5 for 2050.	1
	Fire Weather Days	The historic fire weather days in the area were 22.01 days per year. This is predicted to increase to 31.83 (+44.61%) days under SSP1-2.6 and 38.97 (+77.02%) days under SSP5-8.5 for 2050.	3
	Mean Temperature	The historic mean annual temperature in the area is 9.52°C. This is projected to increase to 10.48°C (+0.95°C) under SSP1-2.6 (optimistic) and 11.02°C (+1.50°C) under SSP5-8.5 (business as usual or pessimistic scenario) for 2050.	3
	Warm Days	Warm day are defined as when the maximum temperature is beyond 90% percentile. The historic warm days in the area are 13.50% per year and this it projected to increase to 26.77% under SSP1-2.6 and 32.47% under SSP5-8.5 scenarios for 2050.	3
Wind Related	Storm Wind Speed	The historic storm wind speed of the area is 15.95 m/s and this is predicted to be increase to 16.40 m/s (+2.79%) for SSP5-8.5 scenario for 2050.	4
	Wind Speed	Historic average wind speed in the area was 5.09 m/s. This is projected to be 4.84 m/s under SSP1-2.6 and 4.97 m/s under SSP5-8.5 for 2050.	5

11.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

- **Size of Proposed Development**: A ten-year planning permission is being sought for a Proposed Development comprising of 589 no. residential units, a neighbourhood centre and all associated development, on a site of approximately 15.27 hectares. The residential component of the development consists of 369 no. houses and 220 no. apartments / duplex units to be provided. The proposed neighbourhood centre is arranged in a 5 storey block and a part 6 storey block with a new public plaza and includes a range of community and commercial uses, comprising a childcare facility (762 sq.m), health centre (201 sq.m),and two no. Class 1- Shop units (124 sq.m) and (141 sq.m). A total of 888 no. car parking spaces are proposed, which includes 711 no. in-curtilage spaces for houses, 115 no. spaces for the duplex apartments / apartments, 14 no. for the commercial uses at the neighbourhood centre, 12 no. spaces for the staff of the childcare facility and 36 no. visitor spaces for residents. A total of 590 no. cycle spaces are proposed for residents, 41 no. spaces for the neighbourhood centre uses and 110 no. visitor cycle parking spaces. The proposal includes hard and soft landscaping, lighting, boundary treatments, communal open space, 2.79 ha of public open space including a Local Park and Pocket Parks, children's play areas and an ancillary play area for the childcare facility. The development will be accessed from the permitted Maynooth Eastern Ring Road (MERR).

- Cumulation with other Proposed Development: The subject site is identified as part of the 'Key Development Area – Railpark' within the Maynooth LAP 2025-2031. In each of the chapters, the impact of the proposed and future planned development will be considered as well as other known 'committed developments' within the surrounding area. A list of the other developments to be considered is provided in Appendix 2.1 in Chapter 2.
- Use of Natural Resources Construction Impacts: Energy, including electricity and fuels, will be required during the construction phase. Construction process will include use of various raw materials. No out of the ordinary use of natural resources is likely during the construction process. No significant negative impacts are likely. Operation Impacts Water, consumption of electricity and energy related to the residential occupancy of the completed development. No out of the ordinary use of natural resources is likely during the operation phase. No significant negative impacts are likely.
- Production of Waste: The construction process will result in some construction related waste, which will be disposed of in compliance with the CEMP. No significant negative impacts are likely Operational waste generated will be domestic waste from the residential units. All domestic waste will be disposed of by a licensed waste contractor. No significant negative impacts are likely. Pollution and Nuisances The construction process has the potential to cause nuisance related to noise, dust and vibration impacts. The CEMP will detail measures to mitigate likely impacts. The Proposed Development will be subject to normal conditions related to construction working hours to protect the residential amenity of the area. With mitigation measures in place no significant negative impacts are likely as a result of the construction phase of the project. An Operational Waste Management Plan will put in place measures to avoid and / or mitigate pollution from operational waste. Suitable parking is provided on site to prevent traffic congestion. With mitigation measures in place no significant negative impacts during operation of the Proposed Development are likely.
- Risk of Major Accidents: Construction Impacts- None foreseen, subject to strict compliance with building regulations and environmental controls. No significant negative impacts are likely. Operation Impacts- None foreseen, subject to compliance with building and fire regulations with mitigation measures in place no significant negative impacts are likely.
- Risk to Human Health: The CEMP will detail measures to mitigate any likely impacts associated with noise, dust, or pollution from the construction process. With mitigation measures in place no significant negative impacts are likely. The Proposed Development will be connected to public water and sewer infrastructure. No emissions other than from air conditioning and heating units are anticipated. No significant negative impacts are likely.

11.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

During both the construction and operational phases of the development, there is potential for various greenhouse gas emissions to be released into the atmosphere. According to TII guidance, the significance of these GHG emissions on the climate is evaluated based on the total emissions across all stages of the Proposed Development.

11.5.1 Construction Phase GHG Assessment

The TII Carbon toolkit was utilised to quantify the construction phase embedded carbon for the Proposed Development. This toolkit can quantify carbon in infrastructure projects using Ireland-specific emission

factors and data. Detailed project information including tonnage of materials was obtained from the Engineering Design Team.

The project design team have also utilised the Irish Green Building Councils (IGBC) Carbon Designer tool for Ireland. This provides a high-level initial assessment of the lifecycle carbon for the development based on basic information and default values with the option to edit these defaults as required to reduce impacts.

Greenhouse gas emissions have been quantified at all aspects of the construction phase including the following stages:

- Production stage: Embodied carbon is the carbon contained within a material or product. It is the sum of all carbon emissions that have been generated during the extraction, processing, and manufacturing of a particular product.
- Transportation to site: emissions associated with the carbon miles of the project materials. The impact of transporting materials from factory/source to site to facilitate construction is reported separately. A series of assumptions are made about the variables that impact transport emissions (material density, vehicle type, vehicle capacity and distance travelled) and assuming that the material may be transported from sources locally within 50km, regionally within 100km and nationally within 250km;
- Site Operations/Construction activities:
    - Site clearance emissions associated with plant and machinery required to clear the site. The carbon tool has a range of assigned land use categories for estimating site clearance. Different land use types have higher or lower carbon intensity for site clearance, which is linked to the energy required to clear the site.
    - Emissions arising from excavation activities based on the energy used in excavation activities. Energy expenditure varies depending on the type of ground to be excavated, e.g., rock excavation is much more energy intensive than topsoil excavation;
    - Construction activities covers carbon emissions generated during the construction of the proposed Project based on the scale and duration of the project; and
    - The generation of waste during the construction phase has potential for climate impact and the nature and scale of this impact depends on the type and volume of waste generated coupled with the nature of the waste treatment (reuse, recycling, recovery or disposal).
- Material replacement & refurbishment: Ongoing material refurbishment and replacement throughout the lifetime of the development is included within this stage of the GHG assessment these are default values based on the typical maintenance requirements for the chosen material types over the assumed 50-year lifetime

The results of the assessment of the above stages using the TII and IGBC tools are presented in Table 11.8 and Figures 11.4 & 11.5. The results indicate that the total GHG emissions generated as a result of the construction of the proposed Project are 36,860,557.00 Kg of CO2eq (36,860.56 tonnes CO2eq).

The carbon assessment has identified hotspots for embodied carbon emissions, particularly those associated with building materials. These emissions have been calculated using standard default materials for different building types within the OneClick tool, as detailed material information was not

available at this stage of the project. Additionally, the average material types from the TII Carbon Tool were utilised for this assessment due to the lack of more specific information.

As anticipated construction materials represent the largest portion of carbon emissions for the Proposed Development, constituting about 74% of the total embodied carbon emissions during the construction phase across the different buildings. The highest carbon impact is observed in the external walls, beams, floors, and roofs, based on the standard default values and assumptions used in the carbon calculations. The rest of the construction phase's embodied carbon emissions come from transportation to the site, site operations, and material replacement.

The total embodied carbon for the construction phase, including the maintenance and replacement of materials throughout the development's lifetime, has been calculated at 36,860.56 tonnes CO2e (see Table 11.8). Since the overall GHG emissions from the development cannot be directly compared to a single sector's 2030 carbon budget, the emissions are categorised into different assessment areas.

These categories must be individually compared to the relevant sectoral emissions budgets, as outlined in Table 11.4. For the Proposed Development, the applicable sectoral emissions budgets include those for Industry Buildings (Residential), Transport, and Waste. The projected emissions for the development are annualised over an assumed 50-year lifespan and then compared to the relevant sector's 2030 carbon budgets. This annualization process facilitates a proper comparison with annual GHG targets.

Table 11.8: Construction Phase Greenhouse Gas Emissions

Stage	GHG Assessment Category	Predicted GHG Emissions (tCO_2e)	Relevant Sector for Cabron Budget Comparison	Annualised GHG Emissions as % of Relevant Cabron Budget
Production Stage	Materials	27,066.57	Industry	0.01353%
Transportation to site	Material Transport	84.60	Transport	0.00003%
Site Operations/Construction activities	Clearance and demolition	77.23	Industry	0.00004%
Site Operations/Construction activities	Excavation	48.30	Industry	0.00002%
Site Operations/Construction activities	Construction Worker Travel to Site	1,889.40	Transport	0.00063%
Site Operations/Construction activities	Construction Waste Disposal	3,014.85	Waste	0.00603%
Site Operations/Construction activities	Construction Waste Transport	18.03	Transport	0.00001%

Site Operations/Construction activities	Construction Fuel Usage	38.60	Transport	0.00001%
Material replacement & refurbishment	Maintenance Material	4,622.98	Industry	0.00231%
Total		**36,861 tCO_2e**		

Note 1 Project lifespan assumed 50 years for calculation purposes in line with best practice

Figure 11.4: Predicted Construction Categories Greenhouse Gas Emissions tCO_2e

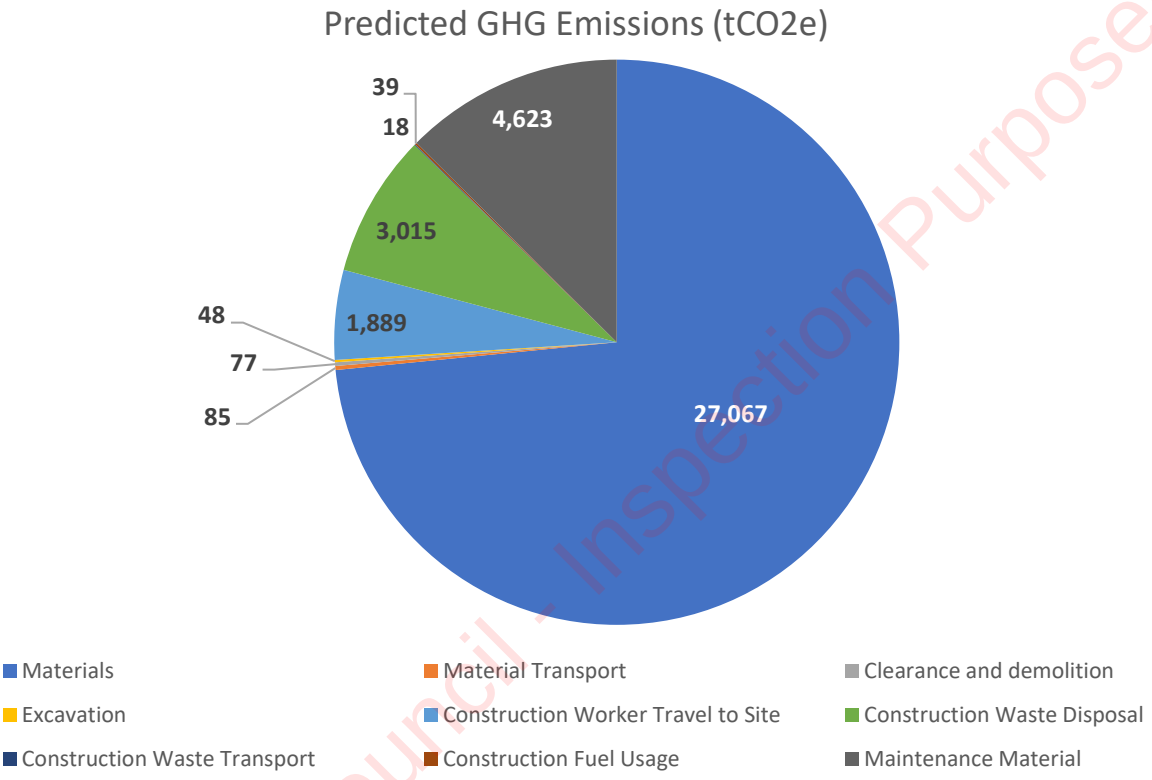
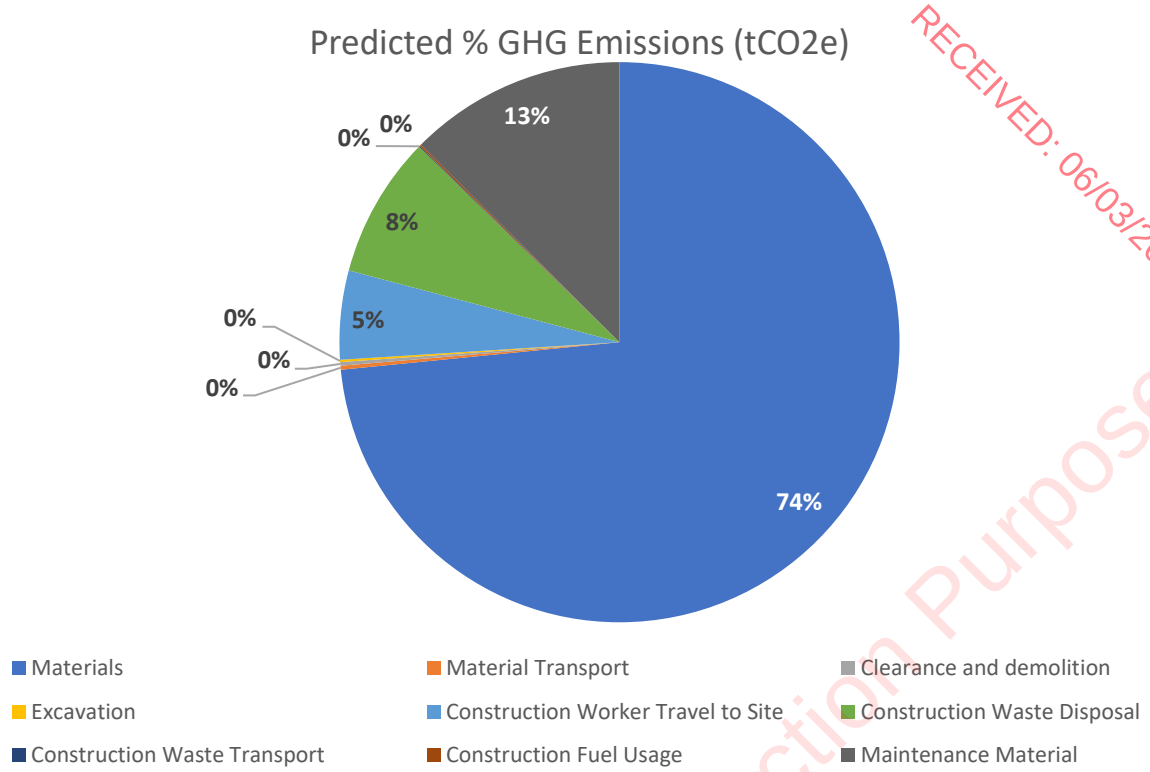


Figure 11.5: Predicted % Construction Categories Greenhouse Gas Emissions tCO_2e



The projected GHG emissions (outlined in Table 11.8) can be averaged across the entire lifespan of the Proposed Development to provide annual emissions estimates, facilitating direct comparison with national annual emissions and targets.

Table 11.9 compares these GHG emissions with the 2030 carbon budgets for the transport, industry, and waste sectors, Ireland's total GHG emissions for 2022, and Ireland's EU 2030 target of a 30% reduction in non-ETS sector emissions from 2005 levels (33 Mt CO2e) as specified in Regulation EU 2018/842.

When annualised over the Proposed Development's 50-year lifespan, the estimated total GHG emissions amount to 0.0013% of Ireland's total GHG emissions in 2023 and 0.0022% of Ireland's non-ETS 2030 emissions target. Specifically, emissions from transport-related activities account for 0.0123% of the 2030 Transport budget, construction waste emissions represent 0.0737% of the Waste budget, and industry-related emissions comprise 0.0184% of the 2030 Industry budget.

Table 11.9: Estimated Construction GHG Emissions relative to Sectoral Budgets and GHG Baseline

Target/Sectoral Budget (tCO_2e)	Sector Annualised Proposed Development GHG Emissions are Compared	Annualised Proposed Development GHG Emissions as % of Relevant Target/Budget

Ireland's 2023 Total GHG Emissions (existing baseline)	58,829,000	Total GHG Emissions	0.0013%
Non-ETS 2030 Target	33,381,312	Total GHG Emissions	0.0022%
(Industry Sector) 2030 Sectoral Budget	4,000,000	Total Industry Emissions	0.0184%
(Transport Sector) 2030 Sectoral Budget	6,000,000	Total Transport Emissions	0.0123%
(Waste Sector) 2030 Sectoral Budget	1,000,000	Total Waste Emissions	0.0737%

11.5.1.1 Impact of Climate Change on the Proposed Construction Phase

According to the 'LA 114 (2019) – Climate' guidance, which has been successfully implemented in the UK and referenced by the EPA here in Ireland, a qualitative assessment of disruption risk should be reported for the construction phase. The guidance suggests that changes to long-term seasonal averages due to climate change are not anticipated to be significant by the construction year, as predictions are typically cantered around mid-century. However, flooding during construction remains a possibility, and the areas at risk of flooding are detailed in Chapter 9 on Water (Including Hydrology & Flood Risk). Flood risk measures and extreme weather considerations have been integrated into the construction planning process.

The site-specific flood risk assessment indicates that no area of the subject site is liable to flood from fluvial, coastal or groundwater sources. All sources indicate that there is a low risk of flooding on site and that the site is within Flood Zone C, ensuring it is appropriate for residential and commercial developments.

Mitigation measures are outlined in Chapter Water (Including Hydrology & Flood Risk) to manage flood risk impacts during the construction stage, affecting the rail line, construction zones, and nearby properties. With these measures implemented, the risk of climate change impacts, particularly flooding, during the construction phase of the proposed project is not deemed significant.

11.5.2 Operational Phase

11.5.2.1 Operational Impacts

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. However, adequate attenuation and drainage have been provided for to account for increased rainfall in future years as part of the design of this development. Therefore, the impact will be long-term, localised, neutral and imperceptible.

There is the potential for a number of greenhouse gas emissions to the atmosphere during the operational phase of the development. The main sources of GHG emissions from the operational stage of the development arise from heating, domestic hot water, and lighting. The proposed project will introduce

sustainable and renewable energy technology to the development. Ongoing maintenance of the Proposed Development materials has been accounted for within Section 11.5.1 above. The following section outlines the impact of operational energy use on GHG emissions.

There is the potential for increased traffic volumes to effect climate, therefore, traffic related CO2 emissions have also been calculated through the use of the TII REM tool. The output is provided in terms of CO2eq for the Opening Year (2028) and Design Year (2043). Both the 'Do Nothing' and 'Do Something' scenarios are quantified in order to determine the degree of change in emissions as a result of the Proposed Development. The predicted concentrations of CO2 for the Opening Year (2028) and Design Year (2043) are detailed in Chapter 10 Air Quality and below in table 11.10.

Table 11.10: Predicted concentrations of traffic related CO2 emissions

Year	Scenario	CO2eq (tonnes/annum)
2028	Do Nothing	3,169.55
	Do Something	3,897.07
2043	Do Nothing	3,210.72
	Do Something	3,993.96
Increment in 2028		727.52
Increment in 2043		783.24

The Proposed Development has been designed to reduce the impact to climate where possible. A number of measures have been incorporated into the design to ensure the operational phase emissions are minimised. These are outlined fully within the Energy Statement prepared by Fallon Design (2025) and are summarised below.

The development will be a Nearly Zero Energy Building (NZEB) in accordance with the Part L2021 requirements. Each building will have a Building Energy Rating (BER) that will comply with the Part L requirements. The following measures, or similar will be incorporated into the Proposed Development to achieve a more energy efficient (i.e. less carbon intensive) design. All measures will be reviewed at the detailed design stage and the most appropriate options will be implemented.

Dwellings

To achieve Part L Compliance for the development Fallon Design (2025) proposes:

- Exceed minimum U-Value standards where possible.
- Achieve air tightness standards of 3 m3/m2/hr.
- Thermally model all thermal bridging details to achieve thermal bridging factors of less than 0.15 W/m2K
- Install high efficiency gas fired boilers and time and temperature zone control in all dwellings
- Install centralized mechanical ventilation systems to ensure adequate ventilation rates are achieved in the dwelling which maximize the benefits of the airtight construction.
- Provide roof high efficiency heat pump technology to meet the renewal requirements and low
- running costs.

Building Other Than Dwellings

The proposed approach to achieving Part L Compliance for the non-residential building will be as follows:

- Exceed minimum U-Value standards where possible.
- Achieve air tightness standards of 5 m3/m2/hr
- Adopt Acceptable Construction Details to limit thermal bridging.
- Analyse the proposed glazing proportions and orientations and select appropriate solar control glazing and/or shading devices to reduce the solar gain to the spaces to an appropriate level.
- Provide roof mounted PV panels to provide the required renewable energy contribution.

It is proposed to incorporate bicycle and electric vehicle parking spaces within the Proposed Development to promote the use of sustainable transport. Overall, these measures will aid in reducing the impact to climate during the operational phase of the Proposed Development. Full descriptions of the measures proposed, and their benefits are outlined within the Building Lifecycle Report submitted with this application.

In Table 11.11, operational GHG emissions have been compared against the carbon budget for the residential sector in 2030, against Ireland's total GHG emissions in 2023 and against Ireland's EU 2030 target of a 30% reduction in non-ETS sector emissions based on 2005 levels (33 Mt CO2e) (set out in Regulation EU 2018/842 of the European Parliament and of the Council).

The estimated total GHG emissions, when annualised over the 50-year Proposed Development lifespan, are equivalent to 0.00129% of Ireland's total GHG emissions in 2023 and 0.00228% of Ireland's non-ETS 2030 emissions target. The total GHG emissions associated with residential-related activities are 0.01323% of the 2030 residential budget.

Table 11.11: Estimated Operational GHG Emissions relative to Residential Budget and GHG Baseline

Target/Sectoral Budget (tCO_2e)		Sector Annualised Proposed Development GHG Emissions are Compared	Annualised Proposed Development GHG Emissions as % of Relevant Target/Budget
Ireland's 2023 Total GHG Emissions (existing baseline)	58,829,000	Total GHG Emissions	0.00263%
Non-ETS 2030 Target	33,000,000	Total GHG Emissions	0.00463%
(Residential Sector) 2030 Sectoral Budget	5,753,000	Total Industry Emissions	0.02685%
(Transport Sector) 2030 Sectoral Budget	6,000,000	Total Transport emissions	0.013054%

11.5.2.2 GHGA Significance of Effects

The TII guidance (2022) states that the following two factors should be considered when determining significance:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

The level of mitigation described in Section 11.8 has been taken into account when determining the significance of the Proposed Development's construction and operational GHG emissions. According to the TII significance criteria described in Section 11.6.3.4, the significance of the GHG emissions during the construction and operational phase is minor adverse.

In accordance with the EPA guidelines (EPA, 2022), the above significance equates to a significance of effect of GHG emissions during the construction and operational phase which is **direct, long-term, negative and slight, which is overall not significant.**

11.5.3 Climate Change Risk Assessment

11.5.3.1 Construction Phase

A detailed CCRA of the construction phase has been scoped out, as discussed in Section 11.3.3, which state that there are no residual medium or high-risk vulnerabilities to climate change hazards and therefore a detailed CCRA is not required. However, consideration has been given to the Proposed Development's vulnerability to the following climate change hazards with best practice mitigation measures proposed in Section 11.8:

- Flood risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding which could put additional stress on green/blue infrastructure;
- Increased temperatures potentially causing drought/dry spells, dust, wildfires and prolonged periods of hot weather;
- Reduced temperatures resulting in ice or snow;
- Geotechnical impacts; and
- Major Storm Damage – including wind damage.

11.5.3.2 Operational Phase

To assess the vulnerability of the Proposed Development to climate change, it is essential to first evaluate the development's sensitivity and exposure to various climate hazards. The following climate hazards have been analysed in relation to the Proposed Development: flooding (coastal, pluvial, and fluvial), extreme heat, extreme cold, wildfire, drought, extreme wind, lightning, hail, landslides, and fog.
The sensitivity of the Proposed Development to these climate hazards is evaluated independently of its location. Table 11.12 provides a sensitivity assessment of the Proposed Development, rated on a scale from high (3) to medium (2) to low (1). After establishing sensitivity, the exposure of the Proposed Development to each climate hazard is determined, reflecting the likelihood of these hazards occurring at the project site, also rated on a scale of high (3), medium (2), and low (1). The overall vulnerability of the Proposed Development to each climate hazard is then calculated by multiplying sensitivity and exposure, as outlined in Table 11.12.

Table 11.12: Climate Change Vulnerability Assessment

Climate Hazard	Sensitivity	Exposure	Vulnerability
Flooding (Coastal, Pluvial, Fluvial)	1 (Low)	1 (Low)	1 (Low)
Extreme Heat	1 (Low)	1 (Low)	1 (Low)
Extreme Cold	1 (Low)	1 (Low)	1 (Low)
Wildfire	1 (Low)	1 (Low)	1 (Low)
Drought	1 (Low)	1 (Low)	1 (Low)
Extreme Wind	1 (Low)	1 (Low)	1 (Low)
Lightning & Hail	1 (Low)	1 (Low)	1 (Low)
Landslides	1 (Low)	1 (Low)	1 (Low)
Fog	1 (Low)	1 (Low)	1 (Low)

The sensitivity and exposure of the area were assessed using various online tools such as Met Éireann's TRANSLATE tools, Climate Ireland – Climate Change Projection Maps, and the project teams subject matter expertise. The analysis concluded that the Proposed Development has no significant vulnerabilities to the identified climate hazards, as outlined below. All identified vulnerabilities are classified as low. As a result, there are no residual medium or high-risk vulnerabilities related to climate change hazards, making a detailed Climate Change Risk Assessment (CCRA) unnecessary.

The Site-Specific Flood Risk Assessment (SSFRA) conducted by Roughan & O'Donovan (2025) indicates that the site is located within Flood Zone C. The consulted sources indicate that no area of the subject site is liable to flood from fluvial, coastal or groundwater sources. All sources indicate that there is a low risk of flooding on site and that the site is within Flood Zone C, ensuring it is appropriate for residential and commercial developments.

Due to the predicted increase in the frequency and intensity of extreme rainfall events, it is prudent that site specific drainage and management measures aimed at mitigating the effects of pluvial flooding are incorporated into the development design. The Proposed Development includes the construction of a surface water network which consists of Sustainable Urban Drainage Systems (SuDS) measures which will minimise the impact to the receiving environment and manage the pluvial flood risk at the site. The proposed surface water network has been designed with an allowance for climate change as per the KCC CDP 2023-2029 and in accordance with the Kildare County Development Sustainable Drainage System (SuDS).

The correct operation and maintenance of the drainage system is necessary to reduce the risk of human or mechanical error causing pluvial flood risk from blockage. The CFRAM mapping available for the site indicates that the pluvial flood risk to the development is low.

Groundwater flooding occurs when the water table rises above the land surface, this means the natural underground drainage system is incapable of sufficiently draining itself, resulting in the emergence of groundwater at the surface. It generally requires sustained rainfall over relatively longer duration than other forms of flooding, its location is discontinuous, and they can last for weeks or months. The SSFRA has determined that the Proposed Development is not at risk of groundwater flooding.

Regarding wildfires, the Think Hazard! tool developed by the Global Facility for Disaster Reduction and Recovery classifies the wildfire hazard in the area as low. This classification suggests there is a 4% to

10% chance of weather conditions that could support a problematic wildfire in the project area, potentially causing disruptions and posing a low but real risk to life and property each year. Although future climate models predict an increase in conditions favourable to wildfires—such as higher temperatures and extended dry periods—the project's suburban location significantly reduces the wildfire risk. Therefore, the Proposed Development is considered to have a low vulnerability to wildfires.

According to the Landslide Susceptibility Map developed by Geological Survey Ireland (GSI), the Proposed Development Site ranges from Low to Moderately Low in terms of landslide susceptibility.

Extreme temperatures, whether extreme heat or cold, have the potential to affect building materials and associated infrastructure. During the detailed design stage, high-quality, durable, and resilient materials and systems will be selected to withstand future temperature fluctuations and dust due to climate change. Consequently, the Proposed Development is assessed to have, at most, low vulnerabilities to these climate hazards, and a detailed risk assessment is not necessary.

There is no additional vulnerability with respect to all climate hazards when design mitigation has been put in place in order to alleviate this known vulnerability to future climate change risk.

11.5.3.3 CCRA Significance of Effects

With the implementation of design mitigation measures, the Proposed Development faces no substantial risks from climate change. As outlined in the EPA Guidelines (EPA, 2022), the impacts of climate change on the development are considered **direct, long-term, negative**, and **imperceptible**, and are therefore **not deemed significant** in terms of Environmental Impact Assessment (EIA).

11.6 POTENTIAL CUMULATIVE IMPACTS

Regarding the requirement for a cumulative assessment, TII PE-ENV-01104 (2022) indicates that "since the GHG assessment pertains to global climate and the impacts on the receptor from a project are not geographically constrained, the typical approach for cumulative assessment in EIA is not deemed applicable." However, by evaluating the GHG impact of a project in relation to its alignment with Ireland's trajectory towards net zero and sectoral carbon budgets, this assessment will demonstrate the project's potential influence on Ireland's ability to meet its national carbon reduction targets. Consequently, the assessment approach is inherently cumulative.

The following potential cumulative impacts related to climate have been considered within this Environmental Impact Assessment Chapter. Cumulative impacts result from the combined effects of the Proposed Development alongside other existing or planned developments in the area. These impacts can intensify climate-related risks and environmental pressures, leading to more pronounced and widespread consequences. ISEP emphasises the importance of understanding these interactions to develop effective mitigation and adaptation strategies that align with broader sustainability objectives.

Greenhouse Gas (GHG) Emissions

As per ISEP's guidance on assessing climate change within EIAs (2022), the cumulative effect of GHG emissions from the Proposed Development, in conjunction with other developments, must be carefully evaluated. The aggregation of emissions across multiple projects can significantly contribute to global climate change, exacerbating the effects of rising temperatures, more frequent extreme weather events,

and changes in precipitation patterns. To address this, we have identified robust mitigation measures aimed at reducing the development's carbon footprint, ensuring alignment with regional and national climate targets, and adhering to the principles of the EU Taxonomy and Near Zero Energy Building (NZEB) standards. Nearby emission sources to the Proposed Development include Residential sites, retail premises, education facilities and road emissions.

Water Resources and Flooding

ISEP (2022) stresses the importance of considering cumulative impacts on water resources, particularly with respect to flood risks and water availability. The combined effect of increased rainfall due to climate change and additional impermeable surfaces from multiple developments can overwhelm existing drainage infrastructure, leading to a higher frequency and severity of flooding events. This underscores the need for integrated water management strategies that enhance the resilience of water systems and incorporate climate adaptation measures, such as sustainable urban drainage systems (SUDS), as recommended within the site-specific flood risk assessment.

Biodiversity and Habitat Loss

Cumulative impacts on biodiversity are another significant concern. ISEP guidance (2022) highlights that climate change, coupled with habitat loss from multiple developments, can lead to more severe impacts on ecosystems and species. The fragmentation of habitats and disruption of ecological networks can accelerate species decline and reduce ecosystem resilience. To mitigate these impacts, the EIA should incorporate strategies for habitat conservation, restoration, and connectivity, ensuring that biodiversity is protected and enhanced in the face of cumulative pressures.

Air Quality and Human Health

ISEP also advises considering the cumulative impacts on air quality and human health. Increased emissions from multiple developments can lead to higher concentrations of pollutants, exacerbating climate change-related health risks, such as respiratory conditions and heat-related illnesses. The EIA should ensure that air quality management plans are in place and that mitigation measures are designed to minimise emissions, particularly in urban areas where cumulative impacts are more likely to be significant.

Soil Degradation and Erosion

Cumulative impacts on soil degradation and erosion are another area of concern highlighted by ISEP. The combined effects of climate change-induced extreme weather events and land disturbance from construction activities can lead to accelerated soil erosion, reduced fertility, and increased sedimentation in water bodies. Sustainable land management practices, including erosion control measures and soil conservation techniques, should be integrated into the development to mitigate these cumulative impacts.

Infrastructure and Energy Demand

Finally, ISEP's guidance emphasises the importance of considering the cumulative impacts on infrastructure and energy demand. As multiple developments increase the demand for energy, there is a risk of overloading local grids and increasing reliance on fossil fuels, which could exacerbate GHG emissions and climate change. The Proposed Development does promote energy efficiency, the use of

renewable energy sources, and the integration of smart grid technologies to ensure that infrastructure can accommodate future energy needs without compromising climate goals.

11.6.1 Mitigation and Monitoring

In accordance with ISEP guidance (2022), addressing cumulative impacts requires a comprehensive approach that includes effective mitigation strategies and ongoing monitoring. These strategies should focus on enhancing energy efficiency, reducing GHG emissions, protecting natural habitats, managing water resources sustainably, and ensuring resilient infrastructure. Continuous monitoring and adaptive management will be essential to identify cumulative impacts early and to adjust mitigation measures as necessary to minimise long-term environmental and climate-related risks.

By considering cumulative impacts within the climate chapter of the EIA, we ensure a thorough and responsible assessment that aligns with ISEP's best practices, contributing to the sustainability and resilience of both the Proposed Development and the broader environment.

11.7 'DO NOTHING' IMPACT

Under the Do-Nothing Scenario no construction works will take place and the previously identified impacts of carbon emissions from equipment, machinery and development operation will not occur. Therefore, this scenario can be considered neutral in terms of climate.

11.8 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

11.8.1 Construction Phase

11.8.1.1 Climate Resilience Avoidance, Remedial & Mitigation Measures

During the construction stage specific climate resilience measures should focus on ensuring durability, water management, and energy efficiency while mitigating risks associated with extreme weather considering dust, dry spells, shade, cooling, green/blue infrastructure, and the required drainage capacity. Regarding the development's resilience to climate change, the Contractor will be required to mitigate the effects of extreme weather, such as heavy rainfall, flooding, windstorms, and temperature fluctuations, through site risk assessments and method statements. Here are key Avoidance, Remedial & Mitigation Measures:

CLIMATE CONST 1: Foundation & Site Preparation

- Flood Resilient Foundations: Use raised foundations, elevated platforms, or piling where necessary in flood-prone areas.
- Sustainable Drainage Installation: Implement permeable surfaces, drainage channels, green/blue infrastructure and attenuation tanks early in construction.
- Soil Stabilisation: Prevent erosion and dust generation with silt fences, geotextiles, and retaining structures to withstand heavy rainfall.

CLIMATE CONST 2: Structural Reinforcement

- Wind-Resistant Framing: Use reinforced concrete or steel frames with proper anchoring to withstand storms.

- Secure Roof Fixings: Ensure hurricane straps, reinforced trusses, and mechanically fixed roof tiles to prevent wind damage.
- Impact-Resistant Windows & Doors: Install reinforced glass or shutters to reduce storm-related damage.

CLIMATE CONST 3: Water & Moisture Management

- Damp-Proofing Measures: Use high-quality damp-proof membranes (DPM) and damp-proof courses (DPC) in walls and floors.
- Proper Drainage on Site: Ensure temporary drainage solutions including the early adoption of green/blue infrastructure (e.g., trenches, sumps) to manage rainwater and fluctuations in drainage capacity throughout the seasons during construction.
- Weatherproofing Structures: Apply breathable but water-resistant membranes on external walls before cladding installation.

CLIMATE CONST 4: Material Selection & Handling

- Use Climate-Resilient Materials: Preference for treated timber, marine-grade plywood, concrete with low permeability, and corrosion-resistant steel.
- Storage & Protection of Materials: Keep materials covered and off the ground to prevent water damage or degradation.
- Low-Carbon Concrete & Insulation: Use alternatives like GGBS (Ground Granulated Blast-furnace Slag) concrete and eco-friendly insulation.

CLIMATE CONST 5: Energy Efficiency & Passive Design Implementation

- High-Performance Insulation Installation: Ensure proper fitting to avoid thermal bridging and moisture ingress.
- Airtightness Testing During Construction: Conduct interim blower door tests before final finishes to confirm air sealing effectiveness.
- Green Roof Base Layers: Install waterproofing and root barriers early if a green roof is part of the design.

CLIMATE CONST 6: On-Site Climate Adaptation Measures

- Construction Scheduling Considerations: Plan for extreme weather events, avoiding major excavation or external works in heavy rain seasons.
- Cold/Hot Weather Plan: Strategies such as planned road gritting, measures to prevent increased dust during hot dry spells, thermal protection such as shaded and cooler areas, chemical accelerants, temporary enclosures, and alternative heating/cooling solutions to enable builders to overcome these obstacles and achieve successful project outcomes.
- Temporary Wind & Rain Barriers: Use tarpaulins, scaffolding covers, and temporary roofing to protect partially built structures.
- Emergency Power Supply: Have generators or battery backups on site to maintain critical construction processes.

All climate-related hazards listed in the Construction Phase Hazard–Mitigation Matrix overleaf shall be incorporated into the CEMP as enforceable mitigation measures. Each mitigation action shall have an identified responsible person, monitoring frequency, and trigger condition aligned with Met Éireann alerts, site inspections, or predefined thresholds

Table 11.13: Climate Change Construction Phase Hazard–Mitigation Matrix

Climate Hazard	Potential Construction- Phase Impact	Mitigation Measures (to be included in CEMP)	Trigger / Monitoring Mechanism
Prolonged Dry Spells / Drought	• Dust generation from soil stockpiles and haul routes • Desiccation and instability of exposed soils • Increased wildfire susceptibility • Worker heat stress	• Hydro-mulching or drought-resistant vegetation on stockpiles • Scheduled wetting using harvested / non-potable water • Fire-risk controls (no-spark tools, extinguishers, exclusion zones) • Heat-stress protocol: shaded rest areas, hydration management, work-rotation	• Met Éireann dry-spell alerts • Visual dust inspections (daily) • PM10/PM2.5 spot monitoring if required
Extreme Rainfall / Intense Precipitation	• Runoff causing erosion and sediment pollution • Overloading of temporary drainage • Excavation collapse • Delays to concrete curing	• Oversized temporary SuDS (silt traps, settlement tanks) with climate change freeboard • Sequenced earthworks to limit exposed surface area • Rapid-deployment drainage (cut-off drains, temporary ditches) • Protective coverings for exposed soil • Inspection and reinforcement of excavations	• Met Éireann yellow/orange rainfall warnings • Daily inspection of drainage features and excavations
High Winds / Storm Events	• Destabilisation of cranes and scaffolding • Wind-borne debris • Damage to temporary structures and sheeting	• Wind-trigger shutdown protocols for cranes • Secure all sheeting, signage, and loose materials • Lowering of crane booms during high winds • Storage of light materials in sheltered areas	• Anemometer readings •Manufacturer - specific crane wind thresholds
Extreme Heat / High UV	• Worker heat stress	• Mandatory UV-rated PPE	• Daily temperature/UV index •

	• Accelerated degradation of temporary materials • Reduced concrete curing quality	• Adjusted work schedules for heat • Insulated curing blankets; moisture-retentive curing methods • Additional shading/temporary shelter	Heat-stress monitoring records
Cold Spells / Freeze–Thaw	• Frozen ground affecting temporary works • Curing delays; compromised concrete integrity • Slip hazards	• Thermal blankets and insulated formwork • Cold-weather concreting accelerants • Gritting of access routes • Monitoring ground temperatures before excavation	• Met Éireann cold-weather alerts • Ground temperature probes
Wildfire (Low Probability but Climate-Increasing)	• Fire risk to vegetated boundaries and stockpiles • Smoke hazard to workers	• Vegetation management buffer zones • Fire-resistant fencing where required • No-spark tools and smoking restrictions • Onsite fire-fighting equipment	• HSA wildfire advisory updates • Site inspections during prolonged heat/drought
Lightning / Thunderstorm Activity	• Electrocution risk during crane/steel erection • Power surge to temporary site electrics	• Lightning-alert stoppage protocol for crane and steel operations • Surge protection on temporary electrical installations • Evacuation of high-risk elevated work areas	• Lightning warning alerts (Met Éireann / Weather Radar)
Ground Instability (shrink–swell / saturation)	• Excavation collapse • Differential movement beneath temporary structures	• Geotechnical inspections after prolonged dryness or heavy rainfall • Adaptive temporary shoring • Staged excavation	• Soil moisture condition checks • Engineer sign-off after major weather events

Fog / Reduced Visibility	• Increased collision risk for plant and vehicles	• Reduced-speed protocols • Enhanced lighting on plant • Temporary traffic marshals in fog conditions	• Visibility thresholds (e.g., <100 m)
Supply Chain Disruption due to Severe Weather	• Programme delays • Increased idling, emissions, non-compliant workarounds	• Flexible delivery scheduling • Critical materials buffer stock • Idling-reduction enforcement	• Weather-based risk assessments in weekly planning
High Wind-Driven Rain	• Water ingress into partially built structures • Damage to moisture-sensitive materials	• Temporary waterproof membranes • Elevated storage off ground • Weatherproofing early in build sequence	• Rainfall + wind combined warnings

The Applicant is committed to operating in an environmentally responsible manner to reduce their impact on climate change, conserve natural resources and operate in compliance with environmental regulations. They acknowledge the risk of climate change and commit to understanding how their activities and developments contribute to its causes. The Applicant commit to determining what actions they can take to reduce the embodied carbon of construction and the operational energy use of their completed developments. The Applicant believe that risk management is critical to development success and acknowledge that the mitigation of climate risks is beneficial to the global environment, society, and our development assets. Accordingly, they study and incorporate these risk parameters within their development criteria. The Applicant actively seek and develop projects that are consistent with the transition toward a global low carbon economy, the cultivation of resilient developments, communities and enterprises, and their high standards of development with healthy indoor environments, water conservation measures and energy efficient housing with low embodied carbon construction materials.

The Applicant have committed to the following environmental sustainability objectives as part of their ESG Policy:

- Build very energy efficient houses
- Built the largest award winning certified Passive House development in Ireland
- R&D programme to achieve continuous improvement in our designs and building methods to reduce CO2 emissions
- All housing is wired ready for EV chargers, solar PV
- Transitioned electricity supply to 100% renewable electricity for head office and all construction sites
- Replaced 750 000km of diesel car use with full EV Vehicles. The target for full fleet transition by 2025
- Design low carbon developments in all aspects of design, construction and waste management
- Water conserving low flow plumbing fittings are installed as standard

- Waste segregation on site
- Waste reduction management plan
- Developments use excavated soil on site in recreational areas

During the construction phase the following best practice measures shall be implemented on site to prevent significant GHG emissions and reduce impacts to climate:

CLIMATE CONST 7: Energy-Efficient Equipment

- Use energy-efficient machinery and equipment on-site. Regular maintenance and proper operation can also help reduce fuel consumption and emissions.

CLIMATE CONST 8: Renewable Energy

- Incorporate renewable energy sources, such as solar panels, to power construction activities. This can significantly reduce reliance on fossil fuels

CLIMATE CONST 9: Reduce Idling

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.

CLIMATE CONST 10: Sustainability Awareness

- Ensure that sustainability and carbon specifically is incorporated into site team talks, construction and reporting targets. Integrate training clauses for contractors and sub-contractors to upskill their onsite personnel including sub-contractors in low energy construction skills. Appoint sustainability champions to ensure that the project continues to perform in a sustainable manner.

CLIMATE CONST 11: Sustainable Transportation

- Encourage carpooling, use of public transportation, or electric vehicles for workers commuting to the site.

CLIMATE CONST 12: Monitoring and Reporting

- Regularly monitor and report GHG emissions from the construction site. This helps in identifying areas for improvement and ensuring compliance with environmental standards Sustainability spot checks should be added to ongoing site inspections and feedback shared with all onsite to ensure measures are being adopted.

CLIMATE CONST 13: Maintenance

- Ensure all plant and machinery are well maintained and inspected regularly.

CLIMATE CONST 14: Waste Management

- Implement a robust waste management plan to reduce, reuse, and recycle construction waste. Proper waste management can significantly cut down on emissions Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site. Application of the waste hierarchy to all waste material generated.

CLIMATE CONST 15: Sustainable Procurement:

- Sourcing materials locally where possible to reduce transport related CO2 emissions.

CLIMATE CONST 16: Climate Change Adaptation During Construction

- Climate change adaptation measures will be incorporated into the Construction Environmental Management Plan (CEMP) to ensure construction activities remain resilient to increased climate variability. Measures will address prolonged dry spells, extreme rainfall, high winds, temperature extremes and other severe weather events through adaptive site management, including dust and erosion control, oversized temporary drainage with climate-change freeboard, weather-triggered work protocols, protection of temporary works, heat and cold weather working procedures, wildfire and lightning controls, and monitoring of ground and weather conditions. These measures will be informed by Met Éireann warnings, site inspections and ongoing environmental monitoring.

11.8.2 Operational Phase

A number of measures have been incorporated into the design of the development in order to mitigate against the impacts of future climate change. For example, adequate attenuation and drainage have been incorporated into the design of the development to avoid potential flooding impacts as a result of increased rainfall events in future years. These measures have been considered when assessing the vulnerability of the Proposed Development to climate change (see Section 11.4.5).

The Proposed Development has been designed to reduce the impact on climate as a result of energy usage during operation. The Climate Action/Energy Statement and building lifecycle report and submitted under separate cover with this planning application details a number of incorporated design mitigation measures that have been incorporated into the design of the development to reduce the impact on climate wherever possible.

Such measures included in the Proposed Development to reduce the impact to climate from energy usage are:

- The development will be in compliance with the requirements of the Near Zero Energy Building (NZEB) Standards.
- EU Taxonomy alignment with 10% lower than NZEB.
- A renewable energy rating (RER) of 20% will be achieved to comply with Part L (2021) of the NZEB regulations.
- A Building Energy Rating (BER) of A2/A3 is being targeted. This will equate to the following emissions. A2 – 25-50 kwh/m2/yr with CO2 emissions circa 10kgCO2/m2 year A3 – 51-75 kwh/m2/yr with CO2 emissions circa 12kgCO2/m2 /year (JFA; 2025)
- Improved building thermal transmittance (U-Values), air permeability and thermal bridging.
- An exhaust air heat pump system is under consideration for heating, hot water and ventilation of the apartment units.
- PV Solar Panels are proposed in order to meet the renewable energy contribution required by Part L of the Building Regulations.
- Sustainability information provided to building occupants
- Smart building technologies. High standard white goods with high energy efficiency ratings will be supplied to all units.
- Low energy LED public lighting shall be designed and specified in accordance with CIBSE lighting guide and Kildare County Council public lighting standards.

In addition, electric vehicle and bicycle parking will be provided within the development which will promote the use of more sustainable modes of transport and reduce potential transport emissions. Full

descriptions of the measures proposed, and their benefits are outlined within the Building Lifecycle Report submitted with this application.

All operational-phase climate hazards listed in the Operational Hazard–Mitigation Matrix below shall be incorporated into the Operational Environmental Management Plan. Each mitigation action shall be assigned a responsible party (Property Manager/Facilities Management/Amenities Contractor), a monitoring frequency, and event-based trigger conditions.

Table 11.14: Climate Change Operational Phase Hazard–Mitigation Matrix

Climate Hazard	Operational-Phase Impact	Mitigation / Adaptation Measures (for OEMP)	Trigger / Monitoring Mechanism
Extreme Rainfall / Increased Pluvial Flooding	• Overloading of drainage networks • Localised ponding • Increased runoff to public realm	• SuDS designed with climate-adjusted rainfall allowances • Routine inspection and maintenance of attenuation tanks, permeable paving, swales & flow controls • Gully-cleaning and debris management schedule • Overflow routing to landscaped areas	• Heavy rainfall alerts (Met Éireann) • Quarterly SuDS inspections; post-storm inspections
Fluvial Flooding (future climate scenarios)	• Risk to site access routes or surrounding network	• Maintain Flood Zone C-compliant layout • Ongoing review of CFRAM/OPW updates • Ensure emergency access routes remain operable	• OPW flood mapping updates • Annual resilience review
Extreme Heat / Heatwaves	• Overheating in dwellings • Overheating in public realm • Degraded outdoor usability	•High-performance building envelope minimising heat gains • Mechanical ventilation with summer bypass • External shading devices for commercial/ community buildings • Tree canopy and green infrastructure for microclimate cooling	• Heatwave alerts (>25°C for 5 days) • Resident feedback monitoring

		• Resident guidance on passive cooling	
Cold Spells / Freeze–Thaw Conditions	• Icing of footpaths/cycle routes • Increased slip hazards • Stress on external pipework	• Gritting and de-icing plan for pedestrian/cycle routes • Insulated external pipework • Frost-resilient landscaping • Winterisation procedures for pumps/controls	• Met Éireann cold weather alerts • Winter risk inspections
High Winds / Storm Events	• Damage to street furniture, signage, trees • Wind-driven debris	• Tree species and planting designed for wind resilience • Regular tree inspections and pruning • Secure and maintain external fixtures (bollards, lighting, signs)	• Storm warnings • Post-event inspections
Drought / Water Scarcity	• Stress on landscaping • Increased irrigation demand • Reduced stormwater attenuation efficiency	• Drought-tolerant planting palette • Rainwater harvesting for landscape irrigation • Mulching and soil moisture-retention measures	• Extended dry-spell alerts • Monthly landscape audits
Wildfire (Low likelihood but climate-increasing)	• Risk to landscaped boundaries • Smoke affecting air quality	• Maintain defensible landscape zones • Choose low-combustibility planting • Fire management plan for open spaces	• Fire danger ratings / prolonged drought alerts
High Solar Radiation / UV Exposure	• Overheating of exposed surfaces (play areas, tarmac) • Risk to users	• Shade-providing trees/structures in play areas • Use of light-coloured surfacing to reduce heat absorption	• UV index tracking (summer)
Strong Winds + Rain (Wind-Driven Rain)	• Water ingress into building facades	• High-performing building envelope tested for wind-driven rain	• Storm event alerts

	• Accelerated external material weathering	• Maintenance schedule for seals, joints and cladding	• Annual façade condition survey
Lightning Events	• Risk to electrical infrastructure and EV charging systems	• Surge protection within electrical distribution • Lightning protection systems for taller structures	• Lightning warnings
Groundwater Rise (long-term climate scenarios)	• Reduced infiltration capacity of SuDS • Potential stress on basements/services	• Periodic review of groundwater monitoring records • SuDS maintenance verifying infiltration effectiveness	• EPA/OPW groundwater data updates
Stormwater System Blockage (due to extreme events)	• Reduced attenuation effectiveness • Surface flooding	• Enhanced maintenance frequency after severe weather • CCTV surveys of key drains annually	• Post-storm inspections
Tree Failure Risk (climate-exacerbated)	• Falling branches in storms • Safety hazard in public open space	• Arboricultural management plan • Annual tree stability audits	• Storm warnings • Arborist inspection cycles
Energy Demand Extremes (heat or cold)	• Stress on heating/cooling systems • Peak electrical loads	• NZEB-compliant building design reduces thermal load • Smart meters and energy-monitoring systems in common areas • Resident energy-efficiency guidance	• Utility usage trends • Heatwave/ cold-spell alerts

11.9 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

The Proposed Development will result in some impacts to climate through the release of GHGs. TII state that the crux of assessing significance is “not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050”. The Proposed Development has proposed some best practice mitigation measures and is committing to reducing climate impacts where feasible, the development will comply with the do-minimum standards set through regulation (NZEB and Part L 2021). As per the assessment criteria in Section 11.5 the impact of the Proposed Development in relation to GHG emissions is considered **long-term, minor adverse and not significant.**

In relation to climate change vulnerability, it has been assessed that there are no significant risks to the Proposed Development as a result of climate change.

11.10 MONITORING

11.10.1 Construction Phase

We recommend the following monitoring strategies to ensure compliance with the environmental objectives outlined in this EIA. These strategies are essential for effectively managing the environmental impacts associated with the demolition and construction phases, with a particular focus on resource recovery, waste management, and the reduction of greenhouse gas (GHG) emissions.

Compliance with EU Taxonomy for Circular Economy

Given the project's commitment to meeting EU taxonomy requirements, we recommend the following:

- Comprehensive Documentation and Reporting: It is essential to maintain detailed records that document compliance with the circular economy principles outlined in the EU taxonomy. This documentation should include logs of all recycled materials, percentages of materials reused on-site, and detailed descriptions of how circular economy practices are being implemented.
- Independent Third-Party Audits: We recommend engaging an independent auditor to periodically assess the project's compliance with the EU taxonomy. The audit should verify the accuracy of reported data and ensure that the circular economy requirements are fully adhered to throughout the project.

Monitoring of GHG Emissions Reduction Measures

To mitigate the project's impact on climate change, we propose the following monitoring activities:

- Appoint sustainability champions to ensure that the project continues to perform in a sustainable manner including monitoring and reporting of performance on site.
- Idle Time Monitoring for Vehicles and Machinery: We suggest installing GPS or telematics systems on all vehicles and machinery used on-site to monitor engine idling times. Automatic alerts should be set up to notify site managers when idling exceeds a specified threshold, enabling prompt corrective action to reduce unnecessary emissions.
- Maintenance Logs for Plant and Machinery: Implementing a digital maintenance log system to track the inspection and maintenance of all on-site equipment is recommended. This system should record inspection dates, maintenance activities, and any identified issues, ensuring that all machinery operates efficiently and with minimal emissions.
- Material Waste Minimisation Tracking: A monitoring system should be developed to track material orders and usage. This system should identify trends in over-ordering or inefficient material use, enabling the project team to take corrective actions that will help minimise the embodied carbon footprint of the site.

Application of Waste Hierarchy

To optimise waste management on-site, we recommend the following monitoring protocols:

- Waste Segregation Audits: Regular audits should be conducted to ensure that waste is being properly segregated according to the waste hierarchy (reduce, reuse, recycle). These audits will help identify opportunities for improving waste management practices and reducing overall waste generation.
- Monthly Waste Management Reports: We suggest generating monthly reports detailing the volume of waste reduced, reused, and recycled. These reports should be compared against predefined targets to assess the effectiveness of the waste management strategies and to identify areas for improvement.

Local Sourcing of Materials

To reduce transport-related emissions and support local suppliers, we recommend the following:

- Supplier Distance Monitoring: A database of suppliers should be developed, documenting the distance of each supplier from the construction site. This database should be used to monitor and minimise the carbon footprint associated with material transportation, prioritising local suppliers wherever possible.
- Transport-Related Carbon Footprint Analysis: Conducting a carbon footprint analysis for the transportation of all materials to the site is recommended. This analysis should inform the selection of suppliers, with a preference for those within a closer radius to reduce CO2 emissions.

These monitoring recommendations are designed to ensure that the project adheres to its environmental commitments, particularly in the areas of resource recovery, waste management, and greenhouse gas emissions reduction. By implementing these strategies, the project will not only comply with regulatory requirements but also contribute to broader environmental sustainability goals. Regular reporting, on-site inspections, and third-party audits will be critical to maintaining compliance and achieving the desired environmental outcomes.

11.10.2 Operational Phase

Environmental Management Plan that incorporates adaptive management principles.

Ensure climate change resilience plans are robust; continued monitoring of trends in weather events; and continued review of resilience measures related to interdependencies.

We recommend the following monitoring strategies to ensure that the Proposed Development meets its environmental objectives. These strategies focus on mitigating the impacts of climate change, enhancing energy efficiency, and promoting sustainable transport, all of which are aligned with best practices outlined in ISEP guidelines.

To ensure the Proposed Development effectively mitigates the impacts of future climate change, we recommend the following monitoring strategies:

Monitoring of Climate Change Mitigation Measures

- **Attenuation and Drainage Systems Monitoring**: Consistent with ISEP's guidance on climate resilience, regular inspections should be undertaken to verify the functionality of the attenuation and

drainage systems. These inspections should be conducted during construction, after significant rainfall events, and periodically thereafter to ensure long-term effectiveness in preventing flooding.

- **Climate Vulnerability Assessment Review**: In accordance with ISEP's recommendation to periodically reassess climate risks, we suggest reviewing the climate vulnerability assessment (as detailed in Section 11.5.3) at regular intervals. This review should incorporate the latest climate projections to ensure the mitigation measures remain adequate and effective.

Monitoring of Energy Efficiency and Climate Impact Reduction

To minimise the impact of the development on climate through energy use during operation, the following monitoring activities are recommended:

- **NZEB Compliance Verification**: Continuous monitoring during the construction phase should ensure that the development complies with the Near Zero Energy Building (NZEB) Standards. This includes verifying that all building components and systems meet the NZEB criteria.
- **EU Taxonomy Alignment Monitoring**: Ensure that the development achieves energy performance that is at least 10% lower than the NZEB requirements. Regular energy performance assessments should be conducted to confirm alignment with the EU Taxonomy for sustainable development.
- **Renewable Energy Ratio (RER) Compliance**: Monitor the implementation of renewable energy systems, such as solar panels and air source heat pumps, to ensure that the development achieves a Renewable Energy Ratio (RER) of 20%, in line with Part L (2021) of the NZEB regulations. Post-installation, periodic checks should be performed to verify ongoing compliance.
- **Building Energy Rating (BER) Target Achievement**: Regular energy audits should be carried out to monitor the building's energy performance, ensuring that the targeted Building Energy Rating (BER) of A2/A3 is achieved. This includes verifying the efficiency of insulation, windows, HVAC systems, and other energy-related components.
- **Thermal Performance Monitoring**: Continuous monitoring during construction should ensure that the building achieves the improved thermal transmittance (U-Values), air permeability, and thermal bridging standards specified in the design. Post-construction thermal imaging surveys and air tightness tests should be conducted to confirm that these standards have been met.

Monitoring of Renewable Energy Systems

To ensure the successful implementation and operation of renewable energy systems, the following monitoring measures are recommended:

- **Heat Pump Performance**: Regular inspections and maintenance checks should be conducted on the heat pumps to ensure they are operating efficiently and contributing effectively to the building's energy needs. Performance metrics such as Coefficient of Performance (COP) and Seasonal Performance Factor (SPF) should be tracked and compared against the expected values.
- **Occupant Sustainability Information**: Consistent with ISEP's emphasis on stakeholder engagement, it is important to ensure that all building occupants receive comprehensive sustainability information. This should include guidance on energy conservation practices and how to use renewable energy systems effectively. Feedback mechanisms, such as surveys, should be used to assess the impact of this information on occupant behaviour.

Monitoring of Sustainable Transport Initiatives

To promote sustainable transport and reduce transport-related emissions, we recommend the following monitoring strategies:

- **Electric Vehicle (EV) and Bicycle Parking Usage**: Regular monitoring should be carried out to assess the usage of electric vehicle charging stations and bicycle parking facilities within the

development. This will help gauge the effectiveness of these measures in promoting sustainable transport modes. Usage data can inform whether additional facilities or adjustments are needed.

- **Transport Emissions Impact Assessment**: Periodic assessments should be conducted to evaluate the impact of the provided sustainable transport facilities on reducing overall transport emissions. This could include monitoring the uptake of electric vehicles by residents and the corresponding reduction in greenhouse gas emissions.

These monitoring recommendations are designed to ensure that the development's climate change mitigation measures, energy efficiency initiatives, and sustainable transport provisions are effectively implemented and maintained throughout the lifecycle of the project. By adhering to these strategies, the development will not only comply with relevant regulatory requirements but also contribute to broader environmental sustainability goals. Regular inspections, energy performance assessments, and occupant engagement will be crucial to achieving the desired environmental outcomes.

11.11 REINSTATEMENT

Not applicable to climate.

11.12 INTERACTIONS

Climate interactions with various environmental topics are extensive and significant, highlighting the broad impact of climate factors across different aspects of the environment. One of the most critical interactions is between climate and greenhouse gas (GHG) emissions. The Proposed Development's carbon footprint, which includes emissions from construction activities, energy use, and transportation, plays a role in influencing climate change. Effective management and reduction of these emissions are crucial to mitigate the project's contribution to global warming and to comply with regulatory requirements and sustainability targets.

Interactions between climate and water resources are also notable. Climate variability, such as increased rainfall or prolonged droughts, can affect water availability, quality, and management practices. This includes impacts on stormwater runoff, flood risk, and water supply. The development must incorporate effective water management strategies to address these potential issues and ensure resilience to changing climate conditions.

The relationship between climate and biodiversity is significant as well. Changes in temperature and precipitation patterns can alter habitat conditions, disrupt species distributions, and affect ecological balances. These shifts may impact local flora and fauna, necessitating careful consideration of conservation measures to protect biodiversity within and around the development area.

Soil interactions with climate are critical, with changes in climate affecting soil moisture, erosion rates, and land productivity. Increased rainfall may lead to soil erosion, while extended dry periods can degrade soil quality. Addressing these interactions is essential for maintaining soil health and implementing sustainable land use practices.

Human health and well-being are closely linked to climate factors, with climate change potentially exacerbating health issues such as heat stress, respiratory conditions, and vector-borne diseases. The development's impact on local climate conditions and its potential influence on public health must be carefully assessed to prevent adverse health outcomes. The daylight and sunlight assessment and

microclimate / wind assessment of the proposed development is a separate matter to the Climate Chapter of the EIAR and is addressed in standalone reports prepared by GIA accompanying the application.

Cultural heritage sites are also at risk due to climate change, with increased weathering, flooding, and temperature fluctuations potentially accelerating their deterioration. Protecting these valuable resources requires assessing the potential impacts of climate change and implementing appropriate conservation measures.

In summary, the Proposed Development's interactions with climate encompass a range of factors including GHG emissions, water resources, biodiversity, soil, human health, and cultural heritage. Effective mitigation strategies and robust monitoring will be essential to address these interactions, minimise adverse impacts, and ensure the development's resilience to climate change.

11.13 DIFFICULTIES ENCOUNTERED IN COMPILING

There were no difficulties encountered when compiling this assessment.

FI Summary

The Proposed Development demonstrably accords with the National Climate Objective and Objective DO1.4 of the Maynooth and Environs Joint Local Area Plan 2025–2031 through quantified lifecycle emissions performance, climate-risk-robust design, and full integration of biodiversity-positive green infrastructure. The whole-life GHG appraisal, undertaken in accordance with ISEP (2022), PAS 2080, EN 15978 and TII GE-ENV-01106, identifies construction-phase embodied emissions of 36,860.56 tCO_2e—equivalent, when annualised over a 50-year assessment horizon, to <0.0022% of the State's 2030 non-ETS emissions target, <0.0184% of the 2030 Industry ceiling, and <0.0123% of the 2030 Transport ceiling—indicating compliance with sectoral budgets under the 2021 Climate Act and CAP25 emission-reduction trajectories. Operational-phase emissions, incorporating BER/DEAP/NEAP outputs, confirm NZEB-level primary energy performance, an A2/A3 BER target, a Renewable Energy Ratio of ≥20%, and deployment of high-efficiency heat-pump and PV technologies, yielding annualised residential emissions equivalent to only 0.01323% of the 2030 Residential Sector budget.

The Climate Change Risk Assessment, completed in accordance with TII PE-ENV-01104 (2022) and informed by CMIP5/CMIP6 multi-model ensembles and site-specific TRANSLATE projections, identifies exclusively low residual vulnerabilities across all assessed hazards (fluvial/pluvial flooding, extreme heat/cold, drought, wildfire, storm wind, subsidence), supported by Flood Zone C classification and SuDS-integrated hydraulic design incorporating climate-adjusted rainfall allowances.

The spatial layout, incorporating 2.79 ha of native, connected open-space typologies, ecological corridors, and bat-sensitive lighting, ensures compliance with LAP biodiversity objectives GBIO1.1–GBIO1.5 and supports resilience of the wider ecological network. Collectively, the emissions outcome, risk-screened adaptive design, and nature-based infrastructure confirm that the Proposed Development aligns with the statutory climate-neutrality trajectory under Regulation (EU) 2021/1119 and the Climate Action and Low Carbon Development (Amendment) Act 2021, constituting a project-level contribution consistent with a climate-resilient, biodiversity-rich and climate-neutral urban system by 2050.

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APPENDIX 4:

Chapter 16
Summary of EIAR Mitigation and Monitoring Measures

16.0 SUMMARY OF EIAR MITIGATION & MONITORING MEASURES

This Chapter has been revised and updated to take account of updated migration and monitoring measures outlined in the revised Chapters 3, 4 and 11 which have been updated in response to the Request for Further Information issued by Kildare County Council dated 25th November 2025 in respect to KCC Reg. Ref.: 25/61119.

16.1 INTRODUCTION

The central purpose of EIA is to identify potentially significant adverse impacts at the pre-consent stage and to propose measures to mitigate or ameliorate such impacts. This chapter of the EIAR document has been prepared by ***John Spain Associates*** and sets out a summary, for ease of reference, of the range of methods described within the individual chapters of this EIAR document which are proposed as mitigation and for monitoring during the construction and operational phases of the proposed development. It is intended that this chapter of the EIAR document will provide a useful and convenient summary to the competent/consent authority of the range of mitigation and monitoring measures proposed.

EIA related conditions are normally imposed by the competent/consent authority as part of conditions of planning consent and form a key part of the Impact Anticipation and Avoidance strategy. Conditions are principally used to ensure that undertakings to mitigate are secured by explicitly stating the location, quality, character, duration and timing of the measures to be implemented. A secondary role of EIA related conditions is to ensure that resources e.g. bonds / insurances will be available and properly directed for mitigation, monitoring or remedial action, in the event that the impacts exceed the predicted levels.

Monitoring of the effectiveness of mitigation measures put forward in the EIAR document, both by the competent authorities and the developer, is also an integral part of the process. Monitoring of environmental media and indicators arise either from undertakings or from conditions.

In the case of mitigation and monitoring measures it is important for all parties to be aware of the administrative, technical, legal and financial burdens that can accompany the measures proposed. It is also important to ensure that, where monitoring is provided for, it is clearly related to thresholds, which if exceeded cause a clearly defined set of actions to be implemented.

The 2018 EIA Guidelines published by the Department of Housing, Planning and Local Government state:

"While not a mandatory requirement an EIAR can very usefully include a summary table of features and/or measures envisaged to avoid, prevent or reduce and, if possible, offset likely significant adverse effects of the proposed development, and a timescale for the implementation of proposed mitigation measures."

Given the complexity of the scheme in question, and the detail provided within this EIAR, this chapter seeks to provide a complete overview of mitigation and monitoring measures proposed, in the spirit of the above statement within the EIA Guidelines albeit not formatted as a table.

16.2 MITIGATION STRATEGIES

16.2.1 Introduction

There are three established strategies for impact mitigation - avoidance, reduction and remedy. The efficacy of each is directly dependent on the stage in the design process at which environmental considerations are taken into account (i.e. impact avoidance can only be considered at the earliest stage, while remedy may be the only option available to fully designed projects).

16.2.2 Mitigation by Avoidance

Avoidance is generally the fastest, cheapest and most effective form of impact mitigation. Environmental effects and consideration of alternatives have been taken into account at the earliest stage in the project design processes. The consideration of alternatives with respect to the development of the subject lands has been described in Chapter 2, which included design changes to mitigate against environmental impacts.

16.2.3 Mitigation by Reduction

This is a common strategy for dealing with effects which cannot be avoided. It concentrates on the emissions and effects and seeks to limit the exposure of the receptor. It is generally regarded as the "*end of pipe*" approach because it does not seek to affect the source of the problems (as do avoidance strategies above). As such this is regarded as a less sustainable, though still effective, approach.

16.2.4 Reducing the Effect

This strategy seeks to intercept emissions, effects and wastes before they enter the environment. It monitors and controls them so that acceptable standards are not exceeded. Examples include wastewater treatment, filtration of air emissions and noise attenuation measures.

16.2.5 Reducing Exposure to the Impact

This strategy is used for impacts which occur over an extensive and undefined area. Such impacts may include noise, visual impacts or exposure to hazard. The mitigation is affected by installing barriers between the location(s) of likely receptors and source of the impact (e.g. sound barriers, tree screens or security fences).

16.2.6 Mitigation by Remedy

This is a strategy used for dealing with residual impacts which cannot be prevented from entering the environment and causing adverse effects. Remedy serves to improve adverse conditions which exist by carrying out further works which seek to restore the environment to an approximation of its previous condition or a new equilibrium.

16.3 MITIGATION AND MONITORING MEASURES

The following provides a list, for ease of reference, of the mitigation and monitoring measures

recommended in each chapter of the EIAR.

16.3.1 Project Description & Alternatives Examined

Construction Phase

Not applicable.

Operational Phase

Not applicable.

Monitoring

Not applicable.

16.3.2 Population and Human Health

Construction Phase

P&HH CONST 1: Construction and Environmental Management Plan
It will be necessary for the appointed contractor to prepare and implement a Construction and Environmental Management Plan (including traffic management) to reduce the impacts of the construction phase on local residents, ensure the local road network is not adversely affected during the course of the construction project, and incorporate appropriate climate mitigation measures to minimise greenhouse gas emissions and enhance climate resilience during construction. The measures incorporated into the Outline Construction and Environmental Management Plan and this EIAR, including climate mitigation commitments, will inform the CEMP, which can be agreed with the Planning Authority prior to the commencement of development.

P&HH CONST 2: Construction Waste Management Plan
It will be necessary for the appointed contractor to prepare and implement a construction waste management plan in accordance with the requirements of the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects. The measures incorporated into the Outline Construction Waste Management Plan and this EIAR will inform the CWMP, which can be agreed with the Planning Authority prior to commencement of development.

Operational Phase

The operation phase is considered to have likely positive impacts on human beings in relation to the provision of additional residential units in accordance with the principles of sustainable development and zoning objectives pertaining to the site, therefore no additional operational stage mitigation measures are proposed having regard to the mitigation measures within other chapters of this EIAR.

Monitoring

In relation to the impact of the development on population and human health it is considered that the

monitoring measures outlined in regard to the other environmental topics such as water, land and soils biodiversity sufficiently address monitoring requirements.

16.3.3 Archaeology, Architecture and Cultural Heritage

Pre-Construction Phase

The following mitigation measures will be carried out subject to the approval of the National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage (DHLGH) and further mitigation may be sought by the NMS.

ARCH PRE-CONST 1: Archaeological Preservation By Record – Excavation

- Mitigation will be required in the form of excavation with the use of a metal detector of the areas of archaeological activity identified, prior to any site work commencing. While preservation in situ is the preferred option in which to conserve the archaeological resource, this is not warranted or feasible in this case. Hence, preservation by record of the identified archaeological remains will be carried out by a licence-eligible archaeologist in consultation with and under licence from the NMS of the DHLGH. Consultation with the NMS will be maintained throughout. The archaeological sites are as follows:
  - Inhumation burials (C5303, C5305, C5306, C5307), ring-ditch (C5302), extension (C5304) and curvilinear feature/ring-ditch (C5301).
  - Ring-ditch (C4301).
  - Masonry structure (C4501).
  - Any additional archaeological remains that are identified when the areas around the above sites are stripped of topsoil under archaeological supervision.
- Adequate time and resources will be provided by the developer for the resolution of any archaeology identified during the excavation of the above areas, which will be directly impacted by groundworks. Time and resources will also be allowed for any post-excavation work and specialist analysis necessary following the archaeological excavation of these sites.
- A report is required to be compiled on completion of any archaeological excavation and will be submitted to the relevant authorities.

Construction Phase

Archaeology

There is potential for the presence of additional isolated archaeological features to be present in areas that were not assessed during the pre-construction phase (f.ex. between test trenches and outside of the areas that will be stripped for excavation). This includes the area east of the Maynooth Eastern Relief Road that was not accessible for test trenching due to the temporary storage of topsoil, and any other areas in the vicinity of the MERR that were previously inaccessible during works related to the road.

The following mitigation measures will be carried out subject to the approval of the National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage (DHLGH) and further mitigation may be sought by the NMS.

- **ARCH CONST 2: Topsoil Stripping**

- As a result of the identification of significant archaeological features during test trenching, further mitigation will be required in the form of monitoring of topsoil stripping across the site with the use of a metal detector during the construction phase. This is in relation to all groundworks associated with the proposed development, including the previously inaccessible areas adjacent and east of the MERR. The use of appropriate machinery to ensure the preservation and recording of any surviving archaeological remains will be necessary.
- This monitoring will be carried out by a licence-eligible archaeologist in consultation with and under licence from the NMS of the DHLGH. Accordingly, no ground disturbance will take place in the absence of the Archaeologist without his/her express consent. Should any significant archaeological features be discovered, further archaeological mitigation may be required, such as preservation by record. Any further mitigation will require approval from the NMS.
- Adequate time and resources will be provided by the developer for the resolution of any archaeology identified within the development site during the construction phase and which will be directly impacted by groundworks. Time and resources will also be allowed for any post-excavation work and specialist analysis necessary following any archaeological excavation that takes place.
- A report is required to be compiled on completion of any archaeological monitoring and/or excavation and will be submitted to the relevant authorities.

The above mitigation will be included in the Construction Environmental Management Plan, which will be prepared and submitted to the Planning Authority prior to commencement of development.

Architecture

No mitigation is required for the architectural heritage resource during construction.

Cultural Heritage

No mitigation is required for the Cultural heritage resource during construction.

Operational Phase

Archaeology

No mitigation is required.

Architecture

No mitigation is required.

Cultural Heritage

No mitigation is required.

Monitoring

The mitigation measures detailed above would also function as a monitoring system to allow the further assessment of the scale of the predicted impacts and the effectiveness of the mitigation measures.

16.3.4 Biodiversity

Construction Phase

BIO CONST 1: Standard Surface Water and Ground Water Protection Measures

Control of Fuel and Chemical Storage:

Fuel and oil use during the Construction Phase will be minimised and strictly controlled in accordance with procedures outlined in the Construction Environmental Management Plan (CEMP). Where small quantities of oils or chemicals are required, their use will be limited and storage avoided where possible.

- All tank, container, and drum storage areas will be rendered impervious to the materials stored therein. Bunds and storage areas will be designed in accordance with Environmental Protection Agency guidelines 'Storage and Transfer of Materials for Scheduled Activities' (EPA, 2004) and Enterprise Ireland Best Practice Guidelines (BPGCS005). As a minimum, bunded areas will be sized to hold either:
- 110% of the capacity of the largest tank or drum within the bunded area; or
- 25% of the total volume of substances that could be stored within the bunded area.
- Any fuels retained on drip trays, mobile bunds, or similar containment systems will be emptied into a secure, bunded waste oil drum for appropriate off-site disposal.
- Refuelling of plant and machinery will be carried out only at a designated impermeable refuelling station located on-site. This station will be equipped with appropriate containment measures and spill response equipment. A dedicated Environmental and Emergency Spill Response Team will be appointed prior to the commencement of works.
- Where feasible, oil and lubricant changes and general maintenance will be conducted off-site. Only emergency breakdown maintenance will be permitted on-site. Drip trays and spill kits will be available at all times to ensure that any accidental spills are contained and removed promptly.
- All personnel working on-site will receive training in pollution incident control response. Emergency silt control and spillage response procedures, as outlined in the CEMP, will be made available on-site and will include contingency plans for managing silt and chemical spills during construction activities.

Control of Emissions to Surface Water Drainage

- All works will comply with relevant statutory legislation including the Local Government (water Pollution) Acts, 1977 and 1990. The CEMP has been developed with reference to best international practice, including but not limited to:
  - CIRIA C650: Environmental Good Practice on Site (2005)
  - CIRIA C697: The SUDS Manual (2007)
  - CIRIA C648: Control of Water Pollution from Linear Construction Projects (2006)
  - UK Pollution Prevention Guidelines (PPG), Environmental Agency (2004)
  - Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters
- Where required, designated impermeable cement washout areas will be provided. Run-off from working areas and exposed soils will be intercepted at regular intervals and directed to silt traps or settlement lagoons. Overflow from these systems will be directed to land rather than to drainage systems.
- Silty water generated on-site will be treated using temporary silt traps, settlement ponds, and interceptors until permanent drainage infrastructure is operational. Storm drain inlets that may receive runoff from the site will be protected throughout the Construction Phase.

- Weather forecasts will be reviewed regularly, and contingency plans will be prepared in advance of heavy rainfall events to minimise the risk of silt-laden runoff. Where possible, construction activities will be suspended during periods of high rainfall.
- Imported materials will be placed directly in their final location where feasible to avoid double handling. Where temporary storage is necessary, designated areas will be established and surrounded with silt fencing to prevent suspended solids entering surface water systems.
- Temporary hydrocarbon interceptor facilities will be installed and maintained where drainage waters may be discharged to nearby drains. All containment and treatment facilities will be subject to regular inspection and maintenance.
- If portaloos or containerised welfare units are used, all associated waste will be removed from site by a licensed waste disposal contractor. All site personnel will be trained in pollution incident control response.

Control of Emissions to Soil and Groundwater

The measures outline above will also serve to protect soil and groundwater resources. In addition, the following specific controls will be implemented:

- No direct untreated discharge of construction runoff to groundwater will be permitted under any circumstances.
- In the event of a pollution incident, construction works will be halted immediately until the source of contamination is identified and remedied.
- Groundwater may be encountered during excavation works. Where dewatering is required, water will be managed in accordance with CIRIA C750 best practice and any relevant regulatory consents.
- Any excavated soils that are potentially contaminated will be stockpiled in a manner that prevents leaching or runoff. These stockpiles will be located, constructed, and sheeted to ensure containment within the Site boundary.

BIO CONST 2: Tree/Hedgerow Protection

The protection of existing trees and hedgerows during the Construction Phase is essential to preserve ecological corridors, maintain landscape character, and safeguard biodiversity. The following mitigation measures will be implemented to ensure that retained vegetation is not damaged or degraded during site works:

- Prior to the commencement of any construction activities, protective fencing will be erected around all trees and hedgerows designated for retention. This fencing will be installed in accordance with BS 5837:2012 – Trees in relation to design, demolition and construction – Recommendations.
- The fencing will be positioned to fully enclose the Root Protection Area (RPA) of each tree, as defined in the arboricultural constraints plan. The fencing will be robust, clearly marked, and remain in place for the duration of construction works.
- A qualified arborist will inspect and sign off on the fencing installation prior to any site clearance or earthworks. No ground disturbance, stockpiling of materials, or movement of machinery will be permitted within the fenced protection zones.
- All site personnel will be briefed on the importance of tree and hedgerow protection during toolbox talks, and signage will be placed on fencing to reinforce exclusion protocols.
- Any works required in proximity to retained trees (e.g. utility installation or landscaping) will be carried out under the supervision of the appointed arborist and in accordance with best practice guidelines to avoid root damage or canopy stress.

BIO CONST 3: Construction Phase Lighting

As a precautionary measure, and to avoid adverse effects on bats, breeding birds, and other light-sensitive fauna recorded or potentially present on Site (e.g. common lizard), construction phase lighting will be strictly controlled. This is necessary due to the presence of ecological corridors (hedgerows and treelines). The following measures will apply throughout the construction phase:

- No overnight lighting will be directed towards boundary habitats, including hedgerows and treelines. These features will be maintained as unlit ecological corridors throughout the Construction Phase.
- Where overnight lighting is required for health and safety reasons, lighting will be designed and installed to minimise ecological impact, in consultation with the appointed Ecologist and in accordance with Bat Conservation Trust guidelines on artificial lighting and bats (Collins, 2023).
- There will be no light spill to boundary habitats. All luminaires will lack UV and IR elements to reduce ecological disturbance.
- LED luminaires will be used for their directional control, low intensity, good colour rendition, and dimming capability.
- A warm white spectrum (≤3000 Kelvin) will be used to reduce the blue light component of the LED spectrum.
- Luminaires will feature peak wavelengths >550 nm, avoiding the spectral range most disruptive to bats.
- Column heights will be minimised; the shortest allowable height will be selected to reduce light spill.
- Only luminaires with an upward light ratio of 0% and good optical control will be used.
- All luminaires will be mounted horizontally, with no upward tilt.
- Security lighting will be motion-activated and limited to short-duration timers (≤1 minute).
- As a final measure, accessories such as baffles, hoods, and louvres will be installed where necessary to contain light within target areas and prevent spill into adjacent habitats.
- Hedgerows and treelines will be maintained as unlit ecological corridors throughout construction.

BIO CONST 4: Reduction of Noise Related Impacts

Noise generated during the Construction Phase of the Proposed Development may cause temporary disturbance to faunal species including breeding birds, non-volant mammals, and potentially bats. To minimise disturbance, the following measures will be implemented:

- Selection of plant and equipment with low inherent potential for generating noise.
- Siting of plant and machinery as far away from sensitive ecological receptors as permitted by site constraints.
- Avoidance of unnecessary revving of engines and switching off plant items when not in use.
- Ensuring all plant machinery and vehicles are adequately maintained and serviced to reduce noise emissions.
- Proper balancing of rotating components within plant items to prevent excess vibration.
- Maintenance of internal haul routes to avoid abrupt gradients and surface defects that may contribute to noise.
- Minimisation of material drop heights or placement of resilient matting beneath drop zones to dampen impact noise.
- Where noise originates from resonating body panels or cover plates, appropriate dampening materials or stiffening ribs will be applied safely.
- Limiting high-noise activities to daytime working hours only to reduce disturbance during sensitive periods.

- Appointment of a dedicated site representative responsible for overseeing noise control implementation.
- Monitoring of typical noise levels during critical ecological periods and at key receptor locations to ensure compliance and responsiveness.

BIO CONST 5: Vegetation Clearance

The preferred period for vegetation clearance is within the months of September and October, to avoid the main breeding bird season, bat maternity and roosting season, and mammal hibernation periods. This timing reduces the risk of disturbance or injury to protected and sensitive fauna including nesting birds, hedgehogs, and common lizards.

Where this seasonal restriction cannot be observed, a pre-clearance check for active nests will be carried out immediately prior to any site clearance by a suitably qualified Ecological Clerk of Works (ECoW). This check will be repeated as necessary to ensure compliance with relevant legislation, including the Wildlife (Amendment) Act, 2000. If an active nest is identified, the nest will be protected, and no works will take place in its vicinity until the young have successfully fledged.

All vegetation clearance will be carried out in sections, working in a consistent direction to encourage fauna to move away from the works area and toward retained boundary habitats. Logs and branches from felled vegetation will be reused on-site to create hibernacula for small mammals and reptiles.

A phased cutting approach will be implemented under the supervision of a suitably qualified ECoW to allow wildlife to vacate suitable habitat prior to its removal:

- Phase 1 – Cit vegetation to 150-200mm and remove arisings.
- Phase 2 – After a minimum of one hour, hand-search the cut areas (conducted by the ECoW), remove any sheltering habitat (logs or debris), then cut vegetation to ground level and remove arisings.
- Phase 3 – Conduct a soil scrape to remove root mats and surface refugia.

Where suitable refugia or day-nesting habitats must be removed, this will occur outside of peak vulnerability periods for hedgehogs (i.e. outside June-July), and always under ECoW supervision.

<u>Tree Felling Precautions for Bats</u>

Where tree felling is required, a soft felling approach will be adopted as a precautionary measure due to the highly mobile nature of bats, which may roost opportunistically in different trees on different nights. Soft felling will be conducted under the supervision of a suitably qualified and experienced ecologist and will include the following procedures:

- Tree removal shall be carried out in sections, starting with smaller branches and limbs to allow any bats present the opportunity to disperse.
- Where tree cavities, cracks, or loose bark are present, these sections will be lowered carefully to the ground and left undisturbed for 24-48 hours in a sheltered location to allow any undetected bats to vacate voluntarily.
- Works will avoid overnight felling, particularly during periods when bats are most vulnerable (e.g. maternity season, hibernation period), unless otherwise directed by a bat ecologist.
- All felling will take place during suitable weather conditions (i.e. not during very cold, wet, or windy periods) to minimise stress to any potential bats and maximise the chance of bat activity if present.

This approach ensures compliance with the Wildlife Acts 1976 as amended and guidance from the National Parks and Wildlife Service (NPWS, 2023). Any evidence of bats or roosts found during the works will trigger an immediate halt and consultation with NPWS.

BIO CONST 6: Avoidance of Accidental Trapping of Fauna

To prevent accidental trapping or injury of fauna such as hedgehogs, badgers, foxes, small mammals, and reptiles during the Construction Phase, the following measures will be implemented:

- All excavations (e.g. trenches, footings, service runs) will be covered overnight with boards or sheeting to prevent fauna falling in.
- Where covering is not feasible, ramped escape routes (e.g. soil mounds, wooden planks) with a slope of no greater than 45° will be installed at regular intervals.
- Any open excavations will be checked each morning by the site contractor for trapped fauna before construction resumes.
- Temporary fencing will be designed to avoid entrapment, e.g. using open mesh that allows small mammals to pass or including gaps at the base.
- Construction materials such as pipes, mesh, or sheeting stored on Site will be elevated off the ground or capped at both ends to prevent entry by fauna.
- Netting (e.g. erosion control, sediment fencing, or turf netting) used on Site will be biodegradable, wildlife-friendly mesh or avoided entirely where unnecessary.
- Toolbox talks will be provided to all site staff to raise awareness of protected species, reporting protocols, and responsibilities in the event fauna are encountered.

Operational Phase

BIO OPERA 1: Invasive Species Management

A small number of Cherry Laurel stands were identified within the Site. This species is non-native and invasive, and its removal is necessary to prevent further spread and to support the integrity of native habitats. The following control method will be applied:

- All Cherry Laurel shrubs will be cut at the base using hand tools or mechanical equipment, ensuring minimal soil disturbance.
- Stumps will be treated immediately after cutting with an appropriate glyphosate-based herbicide using the cut-stump method.
- Herbicide application will be carried out by a licensed and suitably qualified professional in accordance with the manufacturer's instructions and all relevant legislation.
- Treated areas will be clearly marked and monitored for regrowth. Any regrowth will be re-treated as necessary during follow-up visits.
- All arisings will be removed from Site and disposed of responsibly to prevent vegetative propagation.

BIO OPERA 2: Bat and Mammal Sensitive Lighting – Maintenance of Dark Commuting Corridors

Perimeter hedgerows and habitats that may be used as commuting corridors by both bats and non-volant mammals such as badgers, fox etc., should be kept dark as much as possible to prevent disturbance. In accordance with the best practise bat-friendly lighting guidelines (ILP, 2023), the below measures will be incorporated as part of the Lighting Design of the Proposed Development. These measures will also assist in retaining dark corridors for species other than bats:

- All luminaires should lack UV elements when manufactured. Metal halide, compact fluorescent sources should not be used.
- Any luminaires around the perimeter of the Site will be fitted with shields to ensure no light spill onto hedgerows and treelines.
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white light source (3000 Kelvin or lower) should be adopted to reduce blue light component.
- Light sources should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill.
- Column heights should be carefully considered to minimise light spill and glare visibility. This should be balanced with the potential for increased numbers of columns and upward light reflectance as with bollards.
- Only luminaires with a negligible or zero Upward Light Ratio, and with good optical control, should be considered.
- Luminaires should always be mounted horizontally, with no light output above 90° and/or no upward tilt.
- Where appropriate, external security lighting should be set on motion sensors and set to as short a possible a timer as the risk assessment will allow. For most general residential purposes, a 1 or minute timer is likely to be appropriate.
- Only if all other options have been explored, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed. However, due to the lensing and fine cut-off control of the beam inherent in modern LED luminaires, the effect of cowls and baffles is often far less than anticipated and so should not be relied upon solely.

BIO OPERA 3: Bird Boxes

A variety of 15 no. bird nests boxes will be installed across the Site. Boxes will be of varied shape and size to support different nesting preferences. The locations will be decided by an ecologist. They should be firmly fixed to trees at heights of at least 2m and should be placed as near as possible to hedgerows and other sheltered vegetation. There should be no ledges or suitable perching places for predators such as cats beneath the nest boxes.

BIO OPERA 4: Pre-Commencement Badger Survey

A potential badger sett was recorded within 50 m of the Site footprint, and although currently disused, there remains a possibility it could become active again. Based on its characteristics, including a single entrance, it is likely to be an outlier sett and therefore unlikely to support breeding badgers. Nonetheless, as a precautionary measure, a pre-commencement badger survey should be undertaken no less than three months prior to the start of construction. The survey should cover the entire Site footprint and surrounding lands to within 50m where possible. This will ensure all potential setts are recorded and allow sufficient time for appropriate mitigation to be implemented if required, and if badgers are found to have reoccupied the sett or established a new sett within the footprint of the Proposed Development.

Monitoring

Table 16.1 below provides a summary of the required monitoring and pre-works inspections during the Construction Phase, as well as any surveys that should be completed during the Operational Phase. The

monitoring, inspections and surveys will ensure that the identified mitigation measures are implemented and maintained efficiently and have the desired effect of protecting the local ecology from adverse impacts.

Table 16.1: Monitoring and pre-works inspections for the identified mitigation measures during the Construction Phase of the Proposed Development. To be carried out by a suitably qualified ecologist or ecological clerk of works or by the development contractor.

Measure	Monitoring
Mitigation 1: Standard Surface Water and Ground Water Protection Measures	Contractor / Ecologist
Mitigation 2: Tree and Hedgerow Protection	Contractor / Arborist
Mitigation 3: Construction Phase Lighting Management	Contractor
Mitigation 4: Construction Phase Noise Management	Contractor
Mitigation 5: Vegetation Clearance	Ecologist
Mitigation 6: Avoidance of Accidental Trapping of Fauna	Contractor / Ecologist
Mitigation 7: Invasive Species Management	Contractor / Ecologist
Mitigation 8: Bat-Sensitive Lighting and Mammal Lighting Plan (Operational Phase)	Contractor / Ecologist
BMP 1: Bat Boxes	Ecologist
BMP 2: Bird Nest Boxes	Ecologist
BMP 3: Grassland & Hedgerow Management	Contractor / Ecologist
BMP 4: Pollinator-Friendly SuDS Planting	Contractor / Ecologist
BMP 5: Public Signage	Contractor / Ecologist

16.3.5 Landscape and Visual Impact

Construction Phase

L&V CONST 1: Construction and Environmental Management Plan
During the construction phase, site hoarding will be erected to restrict views of the site during construction. Hours of construction activity will be as set out in the Outline Construction and Environmental Management Plan.

L&V CONST 2: Tree/Hedgerow Protection
The protection of existing trees and hedgerows during the Construction Phase is essential to maintain landscape character. The following mitigation measures will be implemented to ensure that retained vegetation is not damaged or degraded during site works:

- Prior to the commencement of any construction activities, protective fencing will be erected around all trees and hedgerows designated for retention. This fencing will be installed in accordance with BS 5837:2012 – Trees in relation to design, demolition and construction – Recommendations.
- The fencing will be positioned to fully enclose the Root Protection Area (RPA) of each tree, as defined in the arboricultural constraints plan. The fencing will be robust, clearly marked, and remain in place for the duration of construction works.
- A qualified arborist will inspect and sign off on the fencing installation prior to any site clearance or earthworks. No ground disturbance, stockpiling of materials, or movement of machinery will be permitted within the fenced protection zones.
- All site personnel will be briefed on the importance of tree and hedgerow protection during toolbox talks, and signage will be placed on fencing to reinforce exclusion protocols.
- Any works required in proximity to retained trees (e.g. utility installation or landscaping) will be carried out under the supervision of the appointed arborist and in accordance with best practice guidelines to avoid root damage or canopy stress.

Operational Phase

L&V OPERA 1: Landscape Design

A comprehensive landscape architectural design for the entire site is proposed, integrating mitigation measures that are required to avoid or reduce potential negative effects of the development. Please see the landscape plans and reports by AIT Urbanism and Landscape submitted with the planning application for full details of the extensive landscape proposals. The primary measures of note are as follows:

- Retention of existing hedgerows.
- Extensive tree planting to screen and soften the proposed development, create structure in the streetscapes, impart character to the proposed development.
- Extensive native shrub and hedgerow planting, as well as wildflower and perennial plantations to encourage pollinators and native wildlife. Planting is in accordance with the All-Ireland Pollinator Plan.
- A new local public park with recreational space, habitat plantation and integrated Sustainable Drainage measures.
- Extensive areas of greenway and streetscape for walking and cycling.
- Along the Maynooth Eastern Ring Road (MERR), the development presents a strong landscaped frontage, including a formal tree-lined avenue. This not only enhances visual amenity and provides acoustic buffering but also establishes a coherent urban edge that integrates seamlessly with the future growth of Maynooth.
- Native trees, shrubs and wildflowers will be used where possible, particularly in the buffer spaces surrounding the development site.
- Internal streets within the development will also contain a substantial amount street tree planting that will continue to soften and screen the development over the medium to long-term as the trees and planting mature.

Monitoring

A suitably qualified arboricultural consultant / Arboricultural Clerk of Works (ACoW) will be employed prior to commencement of demolition and constructions works to monitor and supervise any tree removal and ensure tree protection measures are in place and maintained.

A suitably qualified Ecological Clerk of Works (ECoW) will be employed prior to commencement of demolition and construction works to provide ecological consultancy to the construction team. The ECoW will carry out monitoring activities as listed in Table 5.30 of Chapter 5: Biodiversity '*Monitoring and pre-works inspections for the identified mitigation measures during the Construction Phase of the Proposed Development.'*

Both the ACow and ECow will liaise with each other as there will be interactions between both professions.

Detailed landscape drawings and specifications will be prepared by the project landscape architect to ensure best practice is adhered to. All landscape works will be supervised by the project landscape architect

16.3.6 Land and Soils

Construction Phase

L&S CONST 1: Construction Environmental Management Plan (CEMP)

A Construction Environmental Management Plan (CEMP) shall be prepared and agreed with the Planning Authority prior to commencement of development, and include the following mitigation measures:

- Stripping of topsoil layer is to be controlled, carefully managed, and coordinated with the proposed staging for the development.
- Topsoil stockpiles to be protected for the duration of the works and not located in areas where sediment laden runoff may enter watercourses.
- Topsoil to be re-used throughout the development in landscaping and public open spaces
- The duration that subsoil layers are exposed to the effects of weather and construction vehicles is to be kept to a minimum. This involves disturbed subsoil layers being stabilised as soon as practical. Backfilling of services trenches, construction of road capping layers, completion of landscaping, and construction of building foundations are to be conducted promptly to limit subsoil exposure.
- Any stockpiles of excavated subsoil material are to be protected for the duration of the construction works and are to be located separate to the topsoil stockpiles and any other stockpiles.
- Site mitigation measures including wheel washing and dust suppression measures to be implemented.
- Measures to be implemented to capture and treat sediment laden surface water runoff especially from foundation excavations and stripped land (e.g. sediment tanks, surface water inlet protection and earth bunding adjacent to open drainage ditches).
- Where possible, excavated subsoil material is to be reused on the site as part of the works (e.g. for landscaping works, for backfill to foundation excavations and for backfill to trenches under non-trafficked areas). It might be also reused in the construction of a suitable formation layer under the proposed residential roads.
- Plant and other construction vehicles delivering materials to site during the works will be restricted to pre-determined haul routes on and entering the site.
- All fuels, oils, paints and any other chemicals are to be stored in a secure hardstanding area.
- Servicing and re-fuelling of construction machinery to be conducted in a designated, hardstanding area if it is not possible to carry out these activities off site.
- Good housekeeping throughout the works, including use of disposal bins and site clean-ups.
- Any hazardous materials to be stored within secondary containment to prevent accidental release.

- All materials removed from site are to be classified prior to removal to ensure correct and appropriate disposal to either a licenced landfill or recovery facility in accordance with the Waste Management Regulations 1998. Any materials that are unable to be reused on site are to be disposed of off-site under licence
- Where bedrock / boulders are encountered in excavations, option to crush and reuse to be considered depending on quantity of material excavated. Screened material may be reused as a fill material e.g. in road construction and backfill to service trenches.
- Where feasible, excavated material is to be reused on the site as part of the works. Any unsuitable excavated subsoil will have to be removed to an approved landfill for disposal.

Operational Phase

L&S OPERA 1: Sustainable Urban Drainage

- Ensuring regular maintenance of site services, SuDS features, such as the SuDS basin, and attenuation systems, such that they operate as designed.

Monitoring

Construction phase monitoring relates to the good maintenance of mitigation measures outlined in Section 7.8, including the Outline Construction and Environmental Management Plan (OCEMP). Soil removed during the construction phase is to be monitored to maximise potential for re-use on site. Monitoring of any hazardous material stored on-site will form part of the proposed Construction Waste Management Plan. A dust management/monitoring programme should be implemented in accordance with the mitigation measures in Section 7.8 and the OCEMP.

Monitoring measures – construction

Proposed monitoring during the construction phase concerning the soil and geological environment are as follows:

- Contractors will be recommended to adhere to the CEMP.
- Construction monitoring of the works (e.g. inspection of existing ground conditions on completion of cut to road sub-formation level in advance of placing capping material, stability of excavations etc.).
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill; protection of soils from contamination for removal from site)
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.)
- Soil removed during the construction phase will be monitored to maximise potential for re-use on site. Any contaminated soil encountered to be analysed and disposed of at a suitable licensed facility.
- The quantities of topsoil and subsoil removed off site will be recorded.

Monitoring measures – operational

No ongoing monitoring will be necessary during the operational phase.

16.3.7 Hydrogeology

Construction Phase

HYDROGEOLOGY CONST 1: Construction and Environment Management Plan

General site works:

- It is recommended that best practice construction methods and practices complying with relevant legislation to avoid or reduce the risk of contamination of watercourses or groundwater in accordance with section 8.8.1 and the CEMP;
- It is recommended that a Site-Specific Construction and Environment Management Plan be developed and implemented during the construction phase. Site inductions to include reference to the procedures and best practice as outlined in the CEMP;
- Measures to be implemented to capture and treat sediment laden surface water runoff especially from basement excavations and stripped land (e.g. sediment tanks, surface water inlet protection and earth bunding adjacent to open drainage ditches);
- Weather conditions and seasonal weather variations will also be taken account of when planning stripping of topsoil and excavations, with an objective of minimizing soil erosion.
- The extent of sub-soil and topsoil stripping to be minimised to reduce the rate and volume of the run-off during construction until the topsoil and vegetation are replaced;
- Concrete batching will take place off site or in a designed area with an impermeable surface;
- Concrete wash down and wash out of concrete trucks will take place on-site into an appropriate washout facility;
- Discharge from any vehicle wheel wash areas is to be directed to on-site settlement tanks;
- Oil and fuel stored on site for construction should be stored in designated areas. These areas shall be bunded and should be located away from surface water drainage and features;
- Refuelling and servicing of construction machinery to take place in a designated hardstanding area, remote from surface water inlets (when it is not possible to carry out such activities off-site);
- Any hazardous materials to be stored within secondary containment designed to retain at least 110% of the storage contents - to prevent the accidental release (fuels, paints, cleaning agents, etc.) with bunds for oil/diesel storage tanks;
- Spill kits will be kept in designated areas for re-fuelling of construction machinery; and
- Dewatering measures will only be employed where necessary.

Operational Phase

HYDROGEOLOGY OPERA 1: Scheme Design and Maintenance

- The design of proposed site levels (roads, Finished Floor Level, (FFL) etc.)) has been carried out to replicate existing surface contours, break lines etc where possible, and therefore replicating existing overland flow paths where possible, and not increasing additional surface water flow in a particular location.
- Surface water runoff from the site will be attenuated to the greenfield runoff rate as recommended in the Greater Dublin Strategic Drainage Study (GDSDS). Surface water discharge rates will be controlled by a flow control devices, with permeable paving and detention basins provided to store runoff from a 1 in 100-year return period event. SUDs features are implemented in the surface water drainage network to reduce the rate of runoff form hard standing area and to improve the quality of surface water runoff.

- Surface water runoff from the development will be collected by an appropriately designed system with contaminants removed prior to discharge i.e. SuDS management train.
- A regular maintenance and inspection programme of the flow control devices, attenuation storage facilities, gullies and SuDS features will be required during the Operational Phase to ensure the proper working of the development's networks and discharges.
- Waste generated by the everyday operation of the development should be securely stored within designated collection areas with positive drainage collection systems to collect potential runoff.
- Operational waste should be removed from site using licenced waste management contractors.

Monitoring

Construction phase monitoring relates to the good maintenance of mitigation measures outlined in section 8.8 including the project specific CEMP. It is recommended that any monitoring of any hazardous material stored on-site be carried out in accordance with the CEMP. It is recommended that a dust management/monitoring programme be implemented during the construction phase of the development in accordance with the CEMP.

Monitoring measures – construction

Proposed monitoring during the construction phase in relation to the hydrogeological environment are as follows:

- Contractors must adhere to the CEMP;
- Construction monitoring of the works (e.g. inspection of services and SuDS installation and backfill, stability of excavations etc.);
- Inspection of fuel / oil storage area;
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities;
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill; protection of soils from contamination for removal from site); and
- Monitoring sediment control measures (sediment retention tanks, surface water inlet protection etc.).

Monitoring measures – operational

Proposed monitoring during the operational phase in relation to the hydrogeological environment are as follows:

- The performance of all SuDS features must be monitored by the relevant authorities during the life of the development.
- Water infrastructure system must be regularly inspected and maintained.
- Monitoring of the installed flow controls, SuDS features and gullies will be required to prevent contamination and increased runoff from the site.
- Although no specific monitoring will be required as part of the proposed development, it is envisaged that EPA Monitoring of the water quality of the water bodies will continue in the area through the life of the development.

16.3.8 Water / Hydrology

Construction Phase

WATER CONST 1: Construction and Environment Management Plan

General site works:

- It is recommended that best practice construction methods and practices complying with relevant legislation to avoid or reduce the risk of contamination of watercourses or groundwater in accordance with section 9.7.1 and the CEMP.
- It is recommended that a Site-Specific Construction and Environment Management Plan be developed and implemented during the construction phase.
- Measures to be implemented to capture and treat sediment laden surface water runoff especially from basement excavations and stripped land (e.g. sediment tanks, surface water inlet protection and earth bunding adjacent to open drainage ditches).
- Weather conditions and seasonal weather variations will also be taken account of when planning stripping of topsoil and excavations, with an objective of minimizing soil erosion.
- The extent of sub-soil and topsoil stripping to be minimised to reduce the rate and volume of the run-off during construction until the topsoil and vegetation are replaced.
- Concrete batching will take place off site or in a designed area with an impermeable surface.
- Concrete wash down and wash out of concrete trucks will take place on-site into an appropriate washout facility.
- Discharge from any vehicle wheel wash areas is to be directed to on-site settlement tanks.
- Oil and fuel stored on site for construction should be stored in designated areas. These areas shall be bunded and should be located away from surface water drainage and features.
- Refuelling and servicing of construction machinery to take place in a designated hardstanding area, remote from surface water inlets (when it is not possible to carry out such activities off-site).
- Any hazardous materials to be stored within secondary containment designed to retain at least 110% of the storage contents - to prevent the accidental release (fuels, paints, cleaning agents, etc.) with bunds for oil/diesel storage tanks.
- Spill kits will be kept in designated areas for re-fuelling of construction machinery.
- Dewatering measures will only be employed where necessary.

Operational Phase

WATER OPERA 1: Scheme Design and Maintenance

- Surface water runoff from the site will be attenuated to the greenfield runoff rate as recommended in the Greater Dublin Strategic Drainage Study (GDSDS). Surface water discharge rates will be controlled through the use of flow controls and detention basins provided to store runoff from a 1 in 100 year return period event. SUDs features are implemented in the surface water drainage network to reduce the rate of runoff form hard standing area and to improve the quality of surface water runoff (Roughan O'Donovan, 2024).
- Surface water runoff from the development will be collected by an appropriately designed system with contaminants removed prior to discharge i.e. petrol interceptor.
- A regular maintenance and inspection programme of the flow control devices, attenuation storage facilities, and gullies will be required during the Operational Phase to ensure the proper working of the development's networks and discharges.

- Waste generated by the everyday operation of the development should be securely stored within designated collection areas with positive drainage collection systems to collect potential runoff.
- Operational waste should be removed from site using licenced waste management contractors.

Monitoring

Construction phase monitoring relates to the good maintenance of mitigation measures outlined in section 9.7 including the project specific Construction Environmental Management Plan (CEMP). It is recommended that any monitoring of any hazardous material stored on-site be carried out in accordance with the CEMP. It is recommended that a dust management/monitoring programme be implemented during the construction phase of the development in accordance with the CEMP.

Monitoring measures – construction

Proposed monitoring during the construction phase in relation to the water and hydrological environment are as follows:

- Contractors will be recommended to adhere to the CEMP.
- Construction monitoring of the works (e.g. inspection of services and SuDS installation and backfill, stability of excavations etc.).
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill; protection of soils from contamination for removal from site).
- Monitoring sediment control measures (sediment retention tanks, surface water inlet protection etc.).

Monitoring measures – operational

Proposed monitoring during the operational phase in relation to the water and hydrological environment are as follows:

- The taking in charge of the water infrastructure will ensure the system is regularly inspected and maintained.
- The performance of all SuDS features will be monitored by the relevant authorities during the life of the development.
- Monitoring of the installed flow controls and gullies will be required to prevent contamination and increased runoff from the site.
- Although no specific monitoring will be required as part of the proposed development, it is envisaged that EPA Monitoring of the water quality of the water bodies will continue in the area through the life of the development.

16.3.9 Air Quality

Construction Phase

AIR CONST 1: Communications

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager;
- Display the head or regional office contact information; and
- Develop and implement a Dust Management Plan (DMP), the final dust management plan will form part of the overall construction management plan which will formally be prepared and submitted to Kildare Council post grant of planning permission.

AIR CONST 2: Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book; and
- Hold regular liaison meetings with other high risk construction sites within 250m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

AIR CONST 3: Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the Kildare County Council when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary;
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the Kildare County Council when asked; and
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

AIR CONST 4: Preparing and Maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- Cover, seed or fence stockpiles to prevent wind whipping.

AIR CONST 5: Operating Vehicle/Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable; and
- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved haul roads.

AIR CONST 6: Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/ mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable.

AIR CONST 7: Waste Management

- Avoid bonfires and burning of waste materials.

AIR CONST 8: Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.

AIR CONST 9: Measures Specific to Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

AIR CONST 10: Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site log book;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);

- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10 m from receptors, where possible.

Operational Phase

It has been determined that the operational phase air quality impact is negligible and therefore no site-specific mitigation measures are proposed.

Monitoring

Monitoring measures – construction

The monitoring of construction dust during the construction phase of the Proposed Development is recommended to ensure that impacts are not experienced beyond the site boundary. Monitoring of dust can be carried out by using the Bergerhoff Method. This involves placing Bergerhoff Dust Deposit Gauges at strategic locations along the site boundaries for a period of 30 +/- 2 days. The selection of sampling point locations should be carried out in consideration of the requirements of VDI 2119 with respect to the location of the samplers relative to buildings and other obstructions, height above ground, and sample collection and analysis procedures. After the exposure period is complete, the Gauges should be removed from the site; the dust deposits in each Gauge will then be determined gravimetrically and expressed as a dust deposition rate in mg/m^2/day in accordance with the relevant standard.

Monitoring measures – operational

Due to the negligible impact on air quality from the operational phase of the Proposed Development, no specific monitoring is recommended.

16.3.10 Climate

Construction Phase

During the construction stage specific climate resilience measures should focus on ensuring durability, water management, and energy efficiency while mitigating risks associated with extreme weather considering dust, dry spells, shade, cooling, green/blue infrastructure, and the required drainage capacity. Regarding the development's resilience to climate change, the Contractor will be required to mitigate the effects of extreme weather, such as heavy rainfall, flooding, windstorms, and temperature fluctuations, through site risk assessments and method statements. Here are key Avoidance, Remedial & Mitigation Measures:

CLIMATE CONST 1: Foundation & Site Preparation

- Flood Resilient Foundations: Use raised foundations, elevated platforms, or piling where necessary in flood-prone areas.
- Sustainable Drainage Installation: Implement permeable surfaces, drainage channels, green/blue infrastructure and attenuation tanks early in construction.
- Soil Stabilisation: Prevent erosion and dust generation with silt fences, geotextiles, and retaining structures to withstand heavy rainfall.

CLIMATE CONST 2: Structural Reinforcement

- Wind-Resistant Framing: Use reinforced concrete or steel frames with proper anchoring to withstand storms.
- Secure Roof Fixings: Ensure hurricane straps, reinforced trusses, and mechanically fixed roof tiles to prevent wind damage.
- Impact-Resistant Windows & Doors: Install reinforced glass or shutters to reduce storm-related damage.

CLIMATE CONST 3: Water & Moisture Management

- Damp-Proofing Measures: Use high-quality damp-proof membranes (DPM) and damp-proof courses (DPC) in walls and floors.
- Proper Drainage on Site: Ensure temporary drainage solutions including the early adoption of green/blue infrastructure (e.g., trenches, sumps) to manage rainwater and fluctuations in drainage capacity throughout the seasons during construction.
- Weatherproofing Structures: Apply breathable but water-resistant membranes on external walls before cladding installation.

CLIMATE CONST 4: Material Selection & Handling

- Use Climate-Resilient Materials: Preference for treated timber, marine-grade plywood, concrete with low permeability, and corrosion-resistant steel.
- Storage & Protection of Materials: Keep materials covered and off the ground to prevent water damage or degradation.
- Low-Carbon Concrete & Insulation: Use alternatives like GGBS (Ground Granulated Blast-furnace Slag) concrete and eco-friendly insulation.

CLIMATE CONST 5: Energy Efficiency & Passive Design Implementation

- High-Performance Insulation Installation: Ensure proper fitting to avoid thermal bridging and moisture ingress.
- Airtightness Testing During Construction: Conduct interim blower door tests before final finishes to confirm air sealing effectiveness.
- Green Roof Base Layers: Install waterproofing and root barriers early if a green roof is part of the design.

CLIMATE CONST 6: On-Site Climate Adaptation Measures

- Construction Scheduling Considerations: Plan for extreme weather events, avoiding major excavation or external works in heavy rain seasons.
- Cold/Hot Weather Plan: Strategies such as planned road gritting, measures to prevent increased dust during hot dry spells, thermal protection such as shaded and cooler areas, chemical accelerants, temporary enclosures, and alternative heating/cooling solutions to enable builders to overcome these obstacles and achieve successful project outcomes.
- Temporary Wind & Rain Barriers: Use tarpaulins, scaffolding covers, and temporary roofing to protect partially built structures.
- Emergency Power Supply: Have generators or battery backups on site to maintain critical construction processes.

CLIMATE CONST 7: Energy-Efficient Equipment

- Use energy-efficient machinery and equipment on-site. Regular maintenance and proper operation can also help reduce fuel consumption and emissions.

CLIMATE CONST 8: Renewable Energy

- Incorporate renewable energy sources, such as solar panels, to power construction activities. This can significantly reduce reliance on fossil fuels

CLIMATE CONST 9: Reduce Idling

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.

CLIMATE CONST 10: Sustainability Awareness

- Ensure that sustainability and carbon specifically is incorporated into site team talks, construction and reporting targets. Integrate training clauses for contractors and sub-contractors to upskill their onsite personnel including sub-contractors in low energy construction skills. Appoint sustainability champions to ensure that the project continues to perform in a sustainable manner.

CLIMATE CONST 11: Sustainable Transportation

- Encourage carpooling, use of public transportation, or electric vehicles for workers commuting to the site.

CLIMATE CONST 12: Monitoring and Reporting

- Regularly monitor and report GHG emissions from the construction site. This helps in identifying areas for improvement and ensuring compliance with environmental standards Sustainability spot checks should be added to ongoing site inspections and feedback shared with all onsite to ensure measures are being adopted.

CLIMATE CONST 13: Maintenance

- Ensure all plant and machinery are well maintained and inspected regularly.

CLIMATE CONST 14: Waste Management

- Implement a robust waste management plan to reduce, reuse, and recycle construction waste. Proper waste management can significantly cut down on emissions Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site. Application of the waste hierarchy to all waste material generated.

CLIMATE CONST 15: Sustainable Procurement:

- Sourcing materials locally where possible to reduce transport related CO2 emissions.

CLIMATE CONST 16: Climate Change Adaptation During Construction

- Climate change adaptation measures will be incorporated into the Construction Environmental Management Plan (CEMP) to ensure construction activities remain resilient to increased climate variability. Measures will address prolonged dry spells, extreme rainfall, high winds, temperature extremes and other severe weather events through adaptive site management, including dust and erosion control, oversized temporary drainage with climate-change freeboard, weather-triggered work protocols, protection of temporary works, heat and cold weather working procedures, wildfire and lightning controls, and monitoring of ground and weather conditions. These measures will be informed by Met Éireann warnings, site inspections and ongoing environmental monitoring.

Operational Phase

A number of measures have been incorporated into the design of the development in order to mitigate against the impacts of future climate change. For example, adequate attenuation and drainage have been incorporated into the design of the development to avoid potential flooding impacts as a result of increased rainfall events in future years. These measures have been considered when assessing the vulnerability of the Proposed Development to climate change (see Section 11.4.5).

The Proposed Development has been designed to reduce the impact on climate as a result of energy usage during operation. The Climate Action/Energy Statement and building lifecycle report and submitted under separate cover with this planning application details a number of incorporated design mitigation measures that have been incorporated into the design of the development to reduce the impact on climate wherever possible.

CLIMATE OPERA 1: Climate Resilient Design and Drainage

- The Proposed Development incorporates adequate attenuation and drainage infrastructure designed with climate change rainfall allowances to avoid potential flooding impacts associated with increased rainfall intensity.
- SuDS features, attenuation systems, permeable paving, swales and flow controls shall be maintained to ensure they operate as designed.
- Overflow routing is directed to landscaped areas to manage exceedance events.
- The vulnerability of the Proposed Development to climate change has been assessed (refer to Section 11.4.5).
- All climate-related operational mitigation measures shall be incorporated into the Operational Environmental Management Plan (OEMP), with assigned responsibilities, inspection frequencies and event-based triggers.

CLIMATE OPERA 2: Energy Efficiency and NZEB Compliance

- The development will comply with the requirements of the Near Zero Energy Building (NZEB) Standards.
- EU Taxonomy alignment will target performance 10% lower than NZEB requirements.
- A Renewable Energy Ratio (RER) of 20% will be achieved in accordance with Part L (2021) of the NZEB regulations.
- A Building Energy Rating (BER) of A2/A3 is being targeted. This will equate to the following emissions. A2 – 25-50 kwh/m2/yr with CO2 emissions circa 10kgCO2/m2 year A3 – 51-75 kwh/m2/yr with CO2 emissions circa 12kgCO2/m2 /year (JFA; 2025)
- Improved building thermal transmittance (U-Values), air permeability and thermal bridging.
- An exhaust air heat pump system is under consideration for heating, hot water and ventilation of the apartment units.
- PV Solar Panels are proposed in order to meet the renewable energy contribution required by Part L of the Building Regulations.
- Sustainability information provided to building occupants
- Smart building technologies. High standard white goods with high energy efficiency ratings will be supplied to all units.
- Low energy LED public lighting shall be designed and specified in accordance with CIBSE lighting guide and Kildare County Council public lighting standards.

CLIMATE OPERA 3: Sustainable Transport Measures

- Electric vehicle charging infrastructure will be provided to facilitate the transition to low-emission vehicles.
- Bicycle parking will be provided to promote active travel and reduce transport-related emissions.

CLIMATE OPERA 4: Climate Hazard Management

- Extreme rainfall: Routine inspection and maintenance of drainage infrastructure, quarterly SuDS inspections and post-storm inspections triggered by heavy rainfall alerts from Met Éireann.
- Fluvial flooding: Ongoing review of flood mapping updates from the Office of Public Works and annual resilience review.
- Extreme heat: High-performance building envelope, mechanical ventilation with summer bypass, shading devices, tree planting for microclimate cooling, and monitoring during heatwave alerts (>25°C for 5 days).
- Cold spells: Gritting and de-icing plan, insulated pipework, winterisation procedures, monitoring during cold weather alerts issued by Met Éireann.
- High winds/storm events: Wind-resilient planting, regular tree inspections, secure external fixtures, post-event inspections following storm warnings.
- Drought conditions: Drought-tolerant planting, rainwater harvesting for irrigation, monthly landscape audits during extended dry spells.
- Wind-driven rain: High-performance building envelope tested for wind-driven rain and annual façade condition surveys.
- Lightning events: Surge protection within electrical distribution systems and lightning protection systems for taller structures.
- Groundwater rise: Periodic review of groundwater monitoring records and SuDS maintenance to verify infiltration performance.
- Stormwater blockage: Enhanced maintenance frequency following severe weather and annual CCTV surveys of key drainage lines.
- Tree failure risk: Arboricultural management plan and annual tree stability audits.
- Energy demand extremes: NZEB-compliant design reducing thermal loads, smart meters in common areas, and monitoring of utility usage trends during heatwaves or cold spells.

Monitoring

Monitoring measures – Construction

We recommend the following monitoring strategies to ensure compliance with the environmental objectives outlined in this EIA. These strategies are essential for effectively managing the environmental impacts associated with the demolition and construction phases, with a particular focus on resource recovery, waste management, and the reduction of greenhouse gas (GHG) emissions.

Compliance with EU Taxonomy for Circular Economy

Given the project's commitment to meeting EU taxonomy requirements, we recommend the following:

- Comprehensive Documentation and Reporting: It is essential to maintain detailed records that document compliance with the circular economy principles outlined in the EU taxonomy. This

documentation should include logs of all recycled materials, percentages of materials reused on-site, and detailed descriptions of how circular economy practices are being implemented.

- Independent Third-Party Audits: We recommend engaging an independent auditor to periodically assess the project's compliance with the EU taxonomy. The audit should verify the accuracy of reported data and ensure that the circular economy requirements are fully adhered to throughout the project.

Monitoring of GHG Emissions Reduction Measures

To mitigate the project's impact on climate change, we propose the following monitoring activities:

- Appoint sustainability champions to ensure that the project continues to perform in a sustainable manner including monitoring and reporting of performance on site.
- Idle Time Monitoring for Vehicles and Machinery: We suggest installing GPS or telematics systems on all vehicles and machinery used on-site to monitor engine idling times. Automatic alerts should be set up to notify site managers when idling exceeds a specified threshold, enabling prompt corrective action to reduce unnecessary emissions.
- Maintenance Logs for Plant and Machinery: Implementing a digital maintenance log system to track the inspection and maintenance of all on-site equipment is recommended. This system should record inspection dates, maintenance activities, and any identified issues, ensuring that all machinery operates efficiently and with minimal emissions.
- Material Waste Minimisation Tracking: A monitoring system should be developed to track material orders and usage. This system should identify trends in over-ordering or inefficient material use, enabling the project team to take corrective actions that will help minimise the embodied carbon footprint of the site.

Application of Waste Hierarchy

To optimise waste management on-site, the following monitoring protocols will be implemented:

- Waste Segregation Audits: Regular audits should be conducted to ensure that waste is being properly segregated according to the waste hierarchy (reduce, reuse, recycle). These audits will help identify opportunities for improving waste management practices and reducing overall waste generation.
- Monthly Waste Management Reports: We suggest generating monthly reports detailing the volume of waste reduced, reused, and recycled. These reports should be compared against predefined targets to assess the effectiveness of the waste management strategies and to identify areas for improvement.

Local Sourcing of Materials

To reduce transport-related emissions and support local suppliers, we recommend the following:

- Supplier Distance Monitoring: A database of suppliers should be developed, documenting the distance of each supplier from the construction site. This database should be used to monitor and minimise the carbon footprint associated with material transportation, prioritising local suppliers wherever possible.

- Transport-Related Carbon Footprint Analysis: Conducting a carbon footprint analysis for the transportation of all materials to the site is recommended. This analysis should inform the selection of suppliers, with a preference for those within a closer radius to reduce CO2 emissions.

These monitoring recommendations are designed to ensure that the project adheres to its environmental commitments, particularly in the areas of resource recovery, waste management, and greenhouse gas emissions reduction. By implementing these strategies, the project will not only comply with regulatory requirements but also contribute to broader environmental sustainability goals. Regular reporting, on-site inspections, and third-party audits will be critical to maintaining compliance and achieving the desired environmental outcomes.

Monitoring measures – Operational

Environmental Management Plan that incorporates adaptive management principles.

Ensure climate change resilience plans are robust; continued monitoring of trends in weather events; and continued review of resilience measures related to interdependencies.

To ensure the Proposed Development effectively mitigates the impacts of future climate change, we recommend the following monitoring strategies:

Monitoring of Climate Change Mitigation Measures

- Attenuation and Drainage Systems Monitoring: Consistent with IEMA's guidance on climate resilience, regular inspections should be undertaken to verify the functionality of the attenuation and drainage systems. These inspections should be conducted during construction, after significant rainfall events, and periodically thereafter to ensure long-term effectiveness in preventing flooding.
- Climate Vulnerability Assessment Review: In accordance with IEMA's recommendation to periodically reassess climate risks, we suggest reviewing the climate vulnerability assessment (as detailed in Section 11.5.3) at regular intervals. This review should incorporate the latest climate projections to ensure the mitigation measures remain adequate and effective.

Monitoring of Energy Efficiency and Climate Impact Reduction

To minimise the impact of the development on climate through energy use during operation, the following monitoring activities are recommended:

- NZEB Compliance Verification: Continuous monitoring during the construction phase should ensure that the development complies with the Near Zero Energy Building (NZEB) Standards. This includes verifying that all building components and systems meet the NZEB criteria.
- EU Taxonomy Alignment Monitoring: Ensure that the development achieves energy performance that is at least 10% lower than the NZEB requirements. Regular energy performance assessments should be conducted to confirm alignment with the EU Taxonomy for sustainable development.
- Renewable Energy Ratio (RER) Compliance: Monitor the implementation of renewable energy systems, such as solar panels and air source heat pumps, to ensure that the development achieves a Renewable Energy Ratio (RER) of 20%, in line with Part L (2021) of the NZEB regulations. Post-installation, periodic checks should be performed to verify ongoing compliance.

- Building Energy Rating (BER) Target Achievement: Regular energy audits should be carried out to monitor the building's energy performance, ensuring that the targeted Building Energy Rating (BER) of A2/A3 is achieved. This includes verifying the efficiency of insulation, windows, HVAC systems, and other energy-related components.
- Thermal Performance Monitoring: Continuous monitoring during construction should ensure that the building achieves the improved thermal transmittance (U-Values), air permeability, and thermal bridging standards specified in the design. Post-construction thermal imaging surveys and air tightness tests should be conducted to confirm that these standards have been met.

Monitoring of Renewable Energy Systems

To ensure the successful implementation and operation of renewable energy systems, the following monitoring measures are recommended:

- Heat Pump Performance: Regular inspections and maintenance checks should be conducted on the heat pumps to ensure they are operating efficiently and contributing effectively to the building's energy needs. Performance metrics such as Coefficient of Performance (COP) and Seasonal Performance Factor (SPF) should be tracked and compared against the expected values.
- Occupant Sustainability Information: Consistent with IEMA's emphasis on stakeholder engagement, it is important to ensure that all building occupants receive comprehensive sustainability information. This should include guidance on energy conservation practices and how to use renewable energy systems effectively. Feedback mechanisms, such as surveys, should be used to assess the impact of this information on occupant behaviour.

Monitoring of Sustainable Transport Initiatives

To promote sustainable transport and reduce transport-related emissions, we recommend the following monitoring strategies:

- Electric Vehicle (EV) and Bicycle Parking Usage: Regular monitoring should be carried out to assess the usage of electric vehicle charging stations and bicycle parking facilities within the development. This will help gauge the effectiveness of these measures in promoting sustainable transport modes. Usage data can inform whether additional facilities or adjustments are needed.
- Transport Emissions Impact Assessment: Periodic assessments should be conducted to evaluate the impact of the provided sustainable transport facilities on reducing overall transport emissions. This could include monitoring the uptake of electric vehicles by residents and the corresponding reduction in greenhouse gas emissions.

These monitoring recommendations are designed to ensure that the development's climate change mitigation measures, energy efficiency initiatives, and sustainable transport provisions are effectively implemented and maintained throughout the lifecycle of the project. By adhering to these strategies, the development will not only comply with relevant regulatory requirements but also contribute to broader environmental sustainability goals. Regular inspections, energy performance assessments, and occupant engagement will be crucial to achieving the desired environmental outcomes.

16.3.11 Noise & Vibration

Construction Phase

N&V CONST 1: Noise at source

Where replacing a noisy item of plant is not viable or practical, consideration should be given to control of noise at the source. This includes modifying the piece of plant or equipment to generate less noise, using dampening to control vibration induced noise or rattling. Example best practice mitigation measures to be considered are as follows:

- All plant and equipment to be switched off when idling.
- The use of white noise reversing alarms.
- Restriction on the dropping and loading of material to less sensitive hours.
- The use of local screening for noisy activities or works with hand tools.
- Not dropping material onto hard surfaces and using rubber mats etc, for the dropping of materials.
- Ensure all plant and equipment is well maintained and cleaned, all lubrication should be in line with manufacturer guidelines

N&V CONST 2: Screening

Screening when used correctly can be an effective method of reducing the construction noise impact on the NSL's. The use of site hoarding and careful selection of areas for noise works, using buildings on the site, site offices and the building being constructed to screen noise from the works.
Local screening of noisy works with the use of temporary acoustic barriers.

N&V CONST 3: Public Engagement

A public liaison officer will be put forward by the contractor to liaise with the local residents on matters relating to noise. Residents should be informed of any noise works scheduled where there is the potential to generate high levels of construction noise or if specialist works etc need to be conducted out of the working hours. This person should also be the point of contact for all complaints and be responsible for reviewing the noise monitoring results and exceedances.

N&V CONST 4: Noise Site Set Up

- Erect a minimum 2.4m high site hoarding that blocks the line of sight between noise source and receiver.
- Example construction for the site hording would be as follows:
- A 2.4m high and 9mm plywood (4.5 kg/m2). Barrier must be solid and not contain gaps at the bottom or between adjacent panels
- Local screening is required around d hand tools in addition to hoarding.
- An absorptive lining should be considered for screening around hand tools will need to have an absorptive lining to avoid reflections increasing noise at other receivers.
- On this project 7 NSL's have been identified, a noise monitor will be placed on the boundary of the nearest noise sensitive locations closest to the works i.e. NSL1 and NSL6 in this case.

N&V CONST 5: Noise Substructure

- Site hoarding to block line of sight. Local screening around noisy plant and equipment.
- Noise monitoring as above.

N&V CONST 6: Noise Superstructure

- Local screening around saws/hammers. Use external new buildings to screen noise from works.
- Noise monitoring as above.

N&V CONST 7: Noise External Finishes

- Local screening around hand tools.
- Noise monitoring as above.

Operational Phase

N&V OP 1: Noise

The operational phase of the development is not predicted to have a negative noise effect considering the predicted effects are in line with the project criteria. Noise associated with the increase in traffic flows is projected to result in a maximum increase of 1dB(A) from baseline figures in 2024 to the "Do Something 2043" scenario, which is considered negligible in terms of perceptible change. Additionally, noise from external plant and equipment has been assessed to meet the required standards, ensuring that operational effects remain minor and localised. Overall, the operational phase will have minimal residual effects on the surrounding environment during both the daytime and night-time periods.

N&V OP 2: Vibration

Prediction of vibration levels at receptors is complex and dependent on several variables including the excavation method, the nature of the used equipment, the properties of the subsoil, the heterogeneity of the soil deposit, the distance to the receptor and the dynamic characteristic of the adjacent structures. Therefore, limits or threshold criteria as set out in BS5228-2 are applied for buildings and humans. As noted above, specific manufacturer limits will apply to sensitive equipment.

BS5228-2 provides some historic data on vibration levels measured on sites from different types of piling equipment under specific conditions e.g. soil type, however there is no data for other types of equipment.

Taking account of the distances to the works and notwithstanding ground conditions present, it is not anticipated that the vibration criteria outlined above will be exceeded. However, precautionary vibration monitoring at the boundary with the nearest sensitive receptors will be undertaken during construction (for vibration generating works).

Monitoring

Noise and vibration monitoring should be considered during the construction phase of the development. Particularly during the substructure stage of construction when piling operations are likely to occur.

There are a multitude of noise sensitive receptors surrounding the development lands, NSL's 1 and 6 are the most suitable locations for noise and vibration monitors to be erected.

16.3.12 Traffic and Transport

Construction Phase

T&T CONST 1: Construction & Environmental Management Plan and Construction Traffic Management

- The Construction & Environmental Management Plan (an outline CEMP accompanies the application) and the associated Construction Traffic Management Plan (CTMP) in addition to the Construction Waste Management Plan for the development will incorporate a range of integrated control measures and associated management initiatives with the objective of mitigating the impact of the proposed developments on-site construction activities
- All construction related parking will be provided on site. Construction traffic will consist of the following categories:
  - Private vehicles owned and driven by site construction staff and by full time supervisory staff. The proposed on-site car parking area will be designed to have the capacity to accommodate this parking demand in addition to an element of visitor parking spaces
  - Excavation plant and dumper trucks involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready mix concrete and mortar, concrete blocks, miscellaneous building materials, etc
- On-site employees will generally arrive before 08:00, thus avoiding morning peak hour traffic. These employees will generally depart after 18:00 and avoid the PM peak hour
- To minimise disruption to the surrounding environment, the following mitigation measures will be implemented;
  - During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads.
  - All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel.
  - A dedicated 'construction' site access / egress junction will be provided during all construction phases.
  - Provision of sufficient on-site parking for staff and visitors (as described above) and compounding through the construction of temporary hardstanding areas to ensure no potential overflow of construction generated traffic onto the local network.
  - A material storage zone will also be provided in the compound area. This storage zone will include material recycling areas and facilities.
  - A series of 'way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas.
  - A dedicated construction haul route has been identified and will be agreed with the local authority prior to the commencement of constructions activities on-site.
  - Truck wheel washes will be installed at construction and discharge from wheel wash area will be directed to on-site settlement ponds.
  - On completion of the works all construction materials, debris, temporary hardstands etc. from the site compound will be removed off site and the site compound area reinstated in full on completion of the works

Operational Phase

T&T OPERA 1: Mobility Management

- A Mobility Management Plan (MMP) is included with the application. The measures identified in the MMP form part of the specific mitigation of this EIAR and a dedicated resident specific Mobility Management Plan (MMP) is to be compiled with the aim of guiding the delivery and management of coordinated initiatives by the scheme promoter. Resident specific MMPs include specialised plans and associated implementation strategies for the subject development proposals. The MMP ultimately

seeks to encourage sustainable travel practices for all journeys by residents and visitors traveling to and from the proposed development. It involves the incorporation of a wide range of possible "hard" and "soft" tools from which to choose from with the objective of influencing travel choices.

Monitoring

Construction phase monitoring relates to the good maintenance of mitigation measures outlined above section and in the Outline Construction Management Plan (OCEMP). The heavy vehicle movement during the construction phase is to be monitored to avoid hassle on site. Monitoring of these heavy vehicles on-site will form part of the proposed Temporary Traffic Management (TTM). This TTM should be implemented in accordance with the mitigation measures in section 13.8 and the OCEMP

Monitoring Measures – construction

Proposed monitoring during the construction phase concerning the traffic and transport are as follows:

- Contractors will be recommended to adhere to the CEMP.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.
- Monitoring of the Temporary Traffic Management (TTM).
- Monitoring of Road safety for the construction workers.

Monitoring Measures – operation

No regular monitoring will be necessary during the operational phase.

16.3.13 Material Assets

Construction Phase

MA CONST 1: Construction and Waste Management Plan
It will be necessary for the appointed contractor to prepare and implement a Construction Waste Management Plan in accordance with the requirements of the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects. The measures incorporated into the Outline Construction Waste Management Plan and this EIAR will inform the CWMP, which can be agreed with the Planning Authority prior to commencement of development.

MA CONST 2: Construction and Environmental Management Plan
A Construction and Environmental Management Plan, including measures for construction traffic management, will be submitted prior to commencement of development and will be implemented in order to protect local amenities and the integrity and operation of the local road network during the construction phase.

MA CONST 3: Provision of Utilities
Provision of utilities will be carried out in accordance with the recommendations of the relevant statutory bodies and providers (ESB, Gas Networks Ireland, Uisce Éireann, EIR, Kildare County Council etc.)

MA CONST 4: Water Metering
Water Metering will be included in each unit to record consumption.

Operational Phase

No mitigation measures are considered necessary during the operational phase.

Monitoring

Monitoring measures will be in accordance with provisions outlined elsewhere in this EIAR document.